CITY OF MARION, ILLINOIS

Capacity, Management, Operations and Maintenance of the City of Marion Sewer Collection System

City of Marion Illinois
System Maintenance Plan
10-1-2016

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1. COLLECTION SYSTEM MANAGEMENT

a. Goals.

The City of Marion's preventive maintenance plan (PMP) covers the assets we manage in our wastewater collection system and is one component of our overall Capacity, Management, Operations and Maintenance (CMOM) Plan. The PMP combines preventive, predictive and corrective maintenance strategies with our best management practices. The CMOM Plan and PMP have been prepared to help the City of Marion effectively manage our wastewater collection system and achieve the following goals:

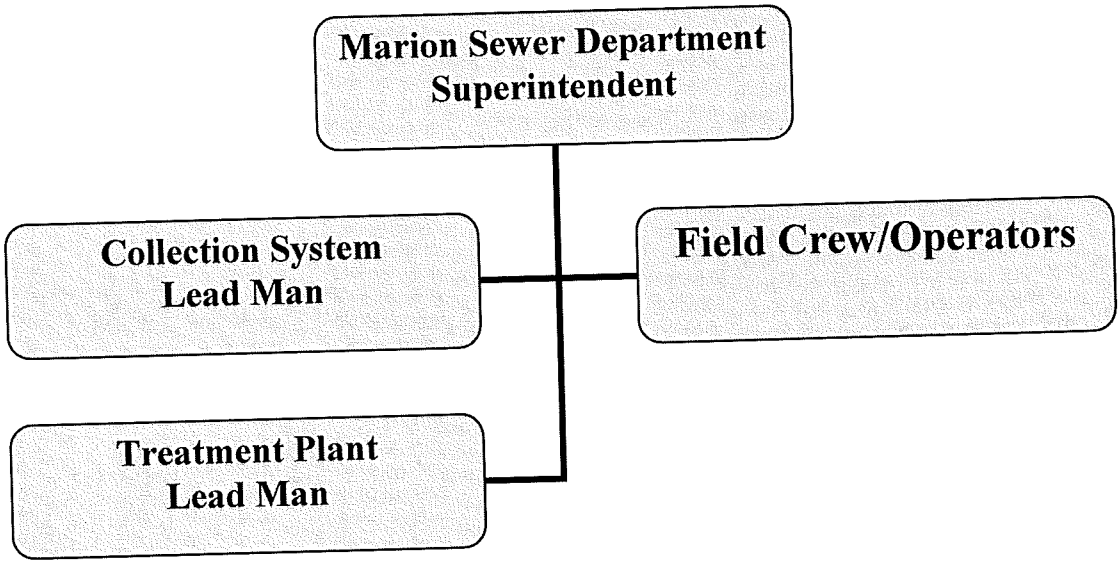
Goals

- Prevent public health hazards
- Protect the environment
- Comply with regulations
- Minimize the frequency of SSOs
- Mitigate the impact of SSOs
- Minimize disruptions in service
- Minimize complaints
- Provide quick response to any disruption in service that occurs
- Protect Marion's large investment in the sewer collection system by maintaining maximum capacity and extending the useful life of the associated assets
- Prevent unnecessary damage to public/private property
- Efficiently use the funds available for the maintenance of the infrastructure and the operation of services
- Reduce expenditures for emergency maintenance
- Convey wastewater to the City of Marion waste water treatment facility with a minimum of infiltration, inflow and exfiltration
- Provide adequate capacity to convey peak flow
- Provide immediate, responsive, and efficient service to all emergency calls
- Provide a safe work environment for employees, employers, and residents in Marion Illinois
- Perform all operations in a safe manner to prevent personal injury
- Utilize evolving technology to increase our effectiveness and efficiency
- Provide reliable service now and into the future

b. Organization

The City of Marion's Sewer Department is an independent department responsible for all aspects of the wastewater collection system and treatment. The department operates and maintains the wastewater treatment plant, collection system, twenty pump stations and approximately one hundred fifty private pump stations. The department has a staff of twelve full-time operation and maintenance positions for both the treatment process and collection system. Contractors are used for maintenance activities and emergency support when issues are too great to be handled by staff. Figure 1 shows the organizational structure of the Marion Sewer Department.

Figure 1- The City of Marion's Sewer Department Organizational Chart



The Marion Sewer Department has twelve full time employees. The department is fully staffed and operates under the following organizational structure:

Sewer Department Superintendent – Establishes policy, plans strategy, leads staff and delegates responsibility, allocates resources, authorizes outside contractors to perform services, and may serve as public information officer. Brent Cain is our Wastewater Superintendent.

The Collection System Lead Man–Works in conjunction with the wastewater superintendent to manage field operations and maintenance activities, provide relevant information to agency management, prepare and implement contingency plans, lead emergency response, investigates and reports SSOs, and trains field crews.

The Treatment Plant Lead Man – Works in conjunction with the wastewater superintendent to manage plant operations and maintenance activities, provide relevant information to agency management, prepare and implement contingency plans, lead emergency response and train wastewater operators. The treatment plant lead man is required to have a Class 1 wastewater operator license, issued by the State of Illinois.

Field Crew/Operators – Conduct staff operations and preventive maintenance activities, mobilize and respond to notification of stoppages and SSOs (e.g., mobilize sewer cleaning equipment, by-pass pumping equipment, and portable generators), maintain and operate the wastewater treatment plant. All sewer department staff are utilized in both the collection system and wastewater treatment facility.

Marion's City Engineer-Prepares wastewater collection system planning documents, manages capital improvement delivery system, documents new and rehabilitated assets, and coordinates development and implementation of CMOM Plan. Clarida- Ziegler Engineering does all engineering work for the City of Marion.

Administrative- All administrative work is coordinated through the Sewer Department Superintendent's office. This work includes but is not limited to supporting staff operations and preventive maintenance activities, data entry and quality control, billing, dispatch, payroll, customer response, outreach, education, and other support functions as needed.

Relation to Other Municipal Functions

The Marion Sewer Department is responsible solely for management, operations and maintenance of the wastewater collection and treatment facilities. Sewer Department personnel are periodically utilized for the benefit of other departmental functions in the city. Many activities of the Marion Sewer Department's sewer collection system are supported by the following City of Marion departments and partners:

- Collection system mapping is supported by the City Engineer and the office of the Marion 911 Coordinator. This department also provides support, policy recommendations, and advice concerning Marion's future growth and development, and is responsible for maintaining and updating the Marion Sewer Department's GIS existing sewer infrastructure mapping system.
- Resources and budget are overseen by the office of the Sewer Superintendent, the Marion City Council, and the Marion City Treasurer.
- Contingency equipment and replacement inventories are shared by the Sewer Department and other city departments.
- Safety Training for the Marion Sewer Department is provided by and coordinated through the Safety Director of the City of Marion.
- Outreach to plumbers and building contractors is done by the Sewer Department and the City of Marion Building Inspector.
- Design and Construction Standards for installation, rehabilitation and repair are overseen and reviewed by the City Engineer in conjunction with the Sewer Department.
- Standards for inspection and testing are developed by the Marion Sewer Department.
- Inspection of grease interceptors/separators is performed by the Marion Sewer Department.
- Outreach for Fats, Oils and Grease is performed jointly by Sewer Department personnel and Franklin-Williamson Bi-County Health Department.
- Personnel hiring and administration are performed by Sewer Department Superintendent in conjunction with Human Resources.
- Procurement of non-routine equipment, services or supplies is authorized by the Sewer Department Superintendent and by the City Council for amounts above $5000.
- Legal Counsel provides legal services and advisory opinions to the Marion Sewer Department on departmental issues, contracts and agreements, and is responsible for handling all claims against the City of Marion and prosecuting violations of all Sewer Use Ordinances.
- The Marion Street Department provides paving service on all sewer repairs performed within public streets and works to coordinate street-paving schedules with sewer work.
- The Marion City Clerk and the Treasurer's office maintain copies of Resolutions and Marion's Ordinances passed by the Marion City Council related to the operation of the Marion Sewer Department.

c. Training

The Marion Sewer Department's training program provides a mechanism for educating employees and establishing their technical competence through the City of Marion's training program and the State of Illinois wastewater operator certification program. The City of Marion utilizes a combination of in-house skill training and the purchase of specialized training through state and national associations, the self-study technical wastewater training courses offered through California State University – Sacramento, conferences and vendor training programs to enhance skills for performing daily work duties and provide certified operators continuing education hours. Skills training for the City of Marion Sewer Department employees include, but are not limited to:

- Routine Line Maintenance
- Heavy Equipment Operation
- Maintenance Equipment Operation
- Line Testing and Inspection
- Infrastructure Installation
- Pump Station Operation and Maintenance
- Electrical and Instrumentation
- Emergency Response
- Public Relations
- Safety

Safety training is obtained from training agencies including the State of Illinois, coordinated thru John A. Logan College. The City of Marion expects employee adherence to the following written safety policies and procedures:

- Confined Space Entry
- Hard Hat Policy
- Vehicle Operation Policy
- Seat Belt Policy
- Respiratory Protection Program
- Excavation Safety Policy and Program
- Chlorine Safety Policy
- Injury Reporting Policy
- Post Accident Drug Testing Policy
- Safety Teams and Committee Policy
- Personal Protective Equipment (provided for the employee)
- First Aid, CPR and AED (First aid supplies are available in office areas and vehicles)
- Flaggers
- Hazard Communication Program

Training records are maintained for each employee by the City of Marion Safety Director. Each department maintains appropriate safety equipment including: protective clothing, safety glasses, hard hats, gloves, respirators, filters, harnesses, tripods, hoists, fire extinguishers and self-contained breathing apparatus. The Marion Fire Department maintains and calibrates

atmospheric testing equipment for the Sewer Department. Lights, barricades, signage and exhaust fans are also available on trucks and service trailers.

d. Customer Service

1. Complaint Management Program

Complaints and requests are received by various means (e.g., phone calls, e-mail, other City of Marion departments, and occasionally in person). Regardless of the nature or means of receipt, all complaints and requests are entered via the dispatcher into our logbook. Entries include the following detailed information about the complaint/request:

- Receiver of complaint / dispatcher
- Time and date of request
- Complainant information (Name, address, call back phone number)
- Location of the problem
- Type of complaint (Codes, e.g. home back up, odor, manhole overflow, etc.)
- Specific request
- Personnel assigned to complaint
- Findings type, including cause of problem
- Complaint closeout information
- Date complaint closed

Once a complaint is assigned, our field personnel perform an investigation. If the problem cannot be immediately resolved, the Sewer Department will generate a work order to take appropriate action for permanent correction of the problem. If the City of Marion is not responsible for correcting the problem the City will provide the complainant with guidance on a recommended course of action. Once an investigation has been completed, the staff enters closeout information into the logbook. Attachment below depicts a typical form from the dispatch logbook.

2. Public Information and Education Program

The City of Marion uses a variety of outlets for providing information and education to customers. The outlet(s) used to disseminate information is often based on the type of information and the targeted audience. The City of Marion routinely uses the outlets listed below to help provide its citizens with the most up-to-date information possible:

- City of Marion Website
- Local Media (TV and Newspaper)
- Marion City Council Agenda
- Public Hearings
- Personal Visits / Phone Calls
- Door Hangers
- Sign Postings
- Customer Mailings

The City of Marion has had and plans to further develop good community relations regarding issues with the operation and maintenance of our collection system. Types of information and

education provided to our customers are as follows:

Information and Education Programs
Sewer System Evaluation Survey Work
Major Repairs and Rehabilitation
New Construction
Road Closures
Point Repairs for Street Paving
Sewer Use Rates
Grease Handling Information
Grease Disposal Information
Private Hauler Instructions
Sewer Use Ordinances
Types of Waste Treated
Industry Pretreatment Requirements
Wastewater Treatment Processes
Customer Emergency Response
Grinder Pump Operation and Maintenance
Complaint Procedures
Service Connection Requirements
Wastewater Collection and Treatment

e. Information Management and Geographic Information Systems

The City of Marion Sewer Department uses the Hach Jobs Cal maintenance program to manage information on our collection system. This system will be connected to the City of Marion's Geographic Information System (GIS) once the system is fully implemented. Table 1 shows the information that will be included in our GIS of the collection system.

Table 1: Collection System Map Information to be included in the City of Marion Sewer Department's GIS

Manholes Basic Map Information - ID number or other unique identifier - Location, with reference to streets and property lines - Depth - GPS coordinates - Size	**Manholes Additional Map Information** - Date built - Rim elevation - Invert elevation - Material Type
Pipes and Siphon Basic Map Information - ID number or other unique identifier - Location, with reference to streets, surface waters, property lines and manholes - Size - Direction of flow - Length - Material type - Date built	**Pipes Additional Map Information** - Slope - Pipe invert elevations - Plan or as-built ID number
Pump Stations Basic Map Information - ID number - Location - Capacity	
Force Main Basic Map Information - ID number or other unique identifier - Location, with reference to streets, surface waters, and property lines - Direction of flow and pump station associated - Length	**Force Main Additional Map Information** - Slope - Invert elevations - Plan or as-built ID number

- Material type - Location of air release valves - Date built - Capacity	

System information managed in our maintenance program and department files includes:

General

- Parts inventory
- Equipment and tools
- Purchase orders
- Revenue

Collection System

- Continuous Sewer System Assessment
- Collection system mapping
- Collection system inventory
- FOG compliance
- Flow monitoring
- SSO/Emergency response

Personnel

- Department staff
- Safety incidents
- Training
- Job performance

Maintenance program

- Routine and Priority Planned maintenance (cleaning, etc.)
- Inspection scheduling and tracking
    - Manhole
    - Pipeline (Closed Circuit Television (CCTV), camera)
    - Pump station
- Work Orders
- Monitoring/Sampling scheduling for hydrogen sulfide
- Vehicle maintenance

Customer service program

- Complaints
- Customer service response
- Billing information

Any activity performed by department personnel is generated and tracked through the Hach JOBS Cal maintenance program. The maintenance program produces time based (daily, weekly, quarterly, etc) written work orders for the performance of routine maintenance as well as repairs

and corrective actions in response to inspection findings or customer complaints. Upon completion of the task(s), data related to the work order is entered into the Hach JOBS Cal program software for tracking performance and historical information on all plant equipment, pump station equipment, and all collection system sewer lines. This program along with the SCADA system serves as the City of Marion Sewer Department's information management system for all of the treatment facility and collection systems operation and maintenance

.

Our Hach JOBS Cal maintenance program is operated through our Local Area Network (LAN). The system is backed up by the Carbonite system backup and access is restricted. Passwords are provided to the City of Marion employees designated for access.

f. Legal Authorities and Controls

1. Sewer Use Ordinance

The City of Marion has established and implemented regulations regarding the use of the wastewater collection system. The City of Marion has a comprehensive sewer use ordinance, consistent with EPA's model ordinance. As regulations and requirements have changed the City of Marion has passed additional ordinances to address those issues. Ordinances are kept up-to-date and are available electronically at the City of Marion's website, http://cityofmarionil.gov/.

The items addressed through our sewer ordinances include: sewer use and standards, access to pipelines and structures, pretreatment requirements, service connections, hauled waste/septage, user rates, permitting of flows into the system, inflow/infiltration control, enforcement of proper design, installation and testing standards, and inspection requirements for new and rehabilitated sewers. The City of Marion reviews the adequacy of user rates annually and adjusts accordingly.

2. Joint Sewer System Agreement

The City of Marion Sewer Department has a sewer maintenance agreement to convey wastewater and provide maintenance for the Federal Wildlife Refuge, and for treatment of waste from the village of Spillertown, Illinois. The City of Marion maintains three lift stations in the Wildlife Refuge, along with all main sewer lines. The village of Spillertown discharges waste to the City of Marion collection system from their village owned and operated lift station. Both entities are billed for the amount of waste discharged into the Marion system.

2. GENERAL INFORMATION ABOUT THE CITY OF MARION, ILLINOIS SANITARY SEWER SYSTEM

a. Wastewater Treatment and Collection System Description

The City of Marion's first formal wastewater collection system dates back to the 1930's and 1940's and the first wastewater treatment facility was constructed in the early 1950's. A new

treatment facility was constructed in 1978, updated in 1985 and again in 2012. This facility now treats all sewage from Interstate 57 east. A new treatment plant was built in 2003 to handle all wastewater flow west of Interstate 57. This flow from west of Interstate 57 is carried from the pump station at Halfway Road to the new treatment plant via a four mile force main. The two treatment facilities have a designed average flow of 4.95 mgd (million gallons per day) and a daily maximum flow of 10.5 mgd. The force main and the collection system transports wastewater to the treatment facilities, both located at the end of South Van Buren Street, in Marion.

The oldest parts of the system are the downtown areas along the east side of town, which also has the highest density of residential customers. The west side of town, having residential customers as well, is also the location of the majority of commercial customers. In 2012, the last major upgrade of the wastewater treatment facility was completed and included a UV system used for the eradication of fecal coliform bacteria. The treated wastewater is discharged to the West End Creek which flows into Crab Orchard Lake.

The City of Marion owns the wastewater collection system within our respective jurisdictions and maintains the collection system. The City of Marion's collection system includes nineteen pump stations and approximately 120 miles of sewers, ranging in size from 6 inches to 24 inches in diameter. The City of Marion also has over 150 private pump stations that the Sewer Department is responsible for maintaining.

The City of Marion does not own or maintain any portion of the sewer laterals that drain each privately owned parcel or property beyond the sewer main. However, the Sewer Department does work with homeowners to prevent backups into their homes.

The City of Marion Sewer Department staff and contractors perform planned maintenance tasks at scheduled frequencies. Frequencies are established based on experience and collection system information to minimize the risk of blockages or equipment failures that could lead to sewer overflows. Some portions of the wastewater collection system are maintained more frequently than others based upon past history and their importance to the effective operation of the wastewater collection system. Staff and/or contractors also perform unplanned maintenance due to emergency backups and repair as the need arises.

b. Collection System Details

- Service Area: App 14 Square miles
- Population Served in primary community: 18,500
- Population in interconnected community: 200
- System Inventory owned by the City of Marion, below:

Miles of gravity sewer	Miles of force main	Number of manholes	Number of pump stations		Number of siphons	Number of air relief valves
			Public	Private		
120	10	2505	19	150		10

- Number of Service Connections:

  Residential: 6708 Commercial: 736 Industrial: 6 Total: 7450

- WWTF Flow Characteristics in MGD

Annual Average Daily System Flow	Average Daily Dry Weather Flow	Peak Wet Weather Flow	Treatment Plant Design Capacity (MGD)	
2.25	4.75	10	Average: 4.95 mgd	Maximum Flow: 10.5 mgd

c. Age Distribution of Collection System

The City of Marion Sewer Department conducts an ongoing program to assess the structural condition and maintenance needs of the collection system as a part of our Cleaning, Inspection and Assessment program and our capital planning described in Resources and Budget section. The Marion Sewer Department has categorized our sewer system by size and length of pipe in the system:

d. Length of Pipe by Diameter

Pipe Diameter (inches)	Length (lineal feet)	Material	Replacement Cost per foot
4			
6	76,245		
8	363,530		
10	40,842		
12	109,455		
15	27,470		
21	10,290		
24	135		
TOTAL	627,967		

e. Sanitary Sewer Overflow History

The City of Marion has experienced multiple sanitary sewer overflows (SSOs) since the early

1970's. No detailed records of these overflows have been recorded. Refer to Section 9 for areas of concerns for SSO's.

To assure sewer capacity the City of Marion Sewer Department is developing programs to address capacity, inflow/infiltration, and condition of our collection system. These programs are described in Sections 3 and 9.

f. System Map

The map will be updated when the GIS mapping system is completed.

3. CLEANING, INSPECTION AND ASSESSMENT PROGRAM

In 2014 the City of Marion Sewer Department began development of our preventive maintenance plan (PMP). This includes our Cleaning, Inspection, and Assessment program to assess the maintenance needs and structural condition of the entire collection system. The goal of this program is to complete the entire system assessment within ten years.

The Sewer Department began the cleaning, inspection and assessment program with a focus on the known problem areas and the older sections of Marion. The results from the cleaning, inspection and assessment program are used to categorize the cleaning frequency and the repair or replacement needs for each component. Critical infrastructure components will also be identified and assessed. Previous knowledge of the condition of the sewer system has also been used to establish more frequent cleaning scheduled for identified problem areas.

The cleaning, inspection and assessment efforts are performed by the Sewer Department personnel in conjunction with Clarida-Ziegler Engineering. All cleaning and inspection data is entered into the maintenance program.

The cleaning, inspection and assessment program includes: sewer cleaning, CCTV inspection of piping, visual inspection and classification of the manhole structures and their flow channels, an evaluation of the condition of the pipes and manholes. Results from the assessment program are used to categorize the cleaning and inspection frequencies for both the sub-areas and problem pipe-sections.

The cleaning and CCTV schedules are closely coordinated. As the Marion Sewer Department's goal is to have a complete cleaning, inspection and system assessment every ten years, approximately ten percent of the system is reviewed by CCTV each year. Approximately twenty percent of the system is cleaned annually: the cleaning performed each year includes the priority cleaning plus the remaining parts of the collection system, factoring in the intermediate and long term interval cleaning schedules. Most of the system cleaning is for gravity lines.

Information from cleaning and inspection is entered and, and incorporated into the maintenance software for scheduled maintenance and capital improvement. This information is also used to update this long term Preventive Maintenance Plan (PMP).

a. Cleaning

Our primary sewer maintenance activity is sewer line cleaning. The City of Marion service area is divided into 40 service areas to be shown in the GIS mapping system.

The cleaning of sewer lines, manholes, siphons and other appurtenances is categorized as: priority (annual or more frequent cleaning); intermediate (2-5 year interval); or long term (6 or more year interval).

Cleaning Schedules – Priority Cleaning

Pipe-sections on a priority cleaning frequency are identified based on known Trouble Spots and Critical Service Areas lists. The Trouble Spots have a history of blockages or overflows as noted in the table below. Locations where sewer malfunction would lead to major disruption are inspected and maintained at greater frequency due to the importance of their function. Inverted siphons of all diameters are typically treated as trouble spots and receive higher frequency care due to potential grease build up and/or debris settling.

Collection System Inventory of Trouble Spots and Schedule for Priority Cleaning

Location	ID #	Description of problem	Cleaning Schedule
Pipe segments			
100 S. Court			monthly
1006 Castellano			monthly
106 S. Vicksburg		Low spot in line	monthly
110 E. Stockton		Grease accumulation	monthly
115 W. Union			monthly
1213 N. Glendale			monthly
1410 Willow Lane		Low spot in line	monthly
1515 N. Garfield		Grease accumulation	monthly
1620 W. Chestnut St.		Backup in manhole	monthly
1700 W. Walnut		Backup in manhole	monthly
1704 Reveille		Low spot in line	monthly
200 S. Granite St.			monthly
205 E. Patrick			monthly
2218 Nichole Lane			monthly
3111 Williamson Co. Pky			monthly
500 N. Market St.		Grease accumulation	monthly
801 N. Otis St.		Grease accumulation	monthly
909 N. Washington St.			monthly
911 N. Bentley St			monthly
Buchanan and E. Main St.		Dead end manhole	monthly
Homeless Shelter		Grease accumulation	monthly
Senior Citizens Center		Grease accumulation	monthly
Union and Liberty St.		Dead end manhole	monthly
East Charles Street			monthly
Liberty and Cline St		Double barrel	monthly
Hub Rec Center	Sec 12 mh8	Backup in manhole	monthly
Boswell Drive	Sec 15A mh40-39	Roots	yearly
Concord & Vicksburg	Sec 3A mh30-35	Roots	yearly
Hendrickson to Malden	Sec 3A mh45-44	Roots	yearly
Jones Street	Sec 1 mh42-43	Roots	yearly
N. Van Buren St	Sec 20A mh44-45	Roots	yearly
Suzanne Drive		Roots	yearly

Cleaning - Gravity Lines Routine Cleaning

This section details schedules for the routine cleaning of each sub-area of the collection system. The system is listed by section and associated cleaning frequency, and which areas are on each of the schedules.

During the first cycle of the Cleaning, Inspection and Assessment program, each pipe and manhole will be evaluated to determine cleaning frequency. An evaluation of each sewer line will be done to determine the need for cleaning and/or a CCTV structural inspection. A pipe section that has not been cleaned in over 5 years, but has been evaluated using the camera and shown that cleaning is not warranted, is assigned to the long term cleaning frequency (5+ years). If the camera evaluation indicates a need for cleaning, the pipe section will be put on the intermediate cleaning frequency. The cleaning schedules for other pipe sections in the sub-area will determine whether the cleaning frequency will be closer to 2 years or 5 years.

The priority cleaning schedule (described above) will be implemented over the next several years as time and money become available.

All cleaning records are kept in the Hach maintenance program data base that tracks the following:

- date, time and location of cleaning activity;
- specific lines cleaned;
- identity of cleaning crew;
- number of passes needed to clean the line;
- presence of root, grease, or debris; and
- Problems identified or other follow up actions necessary.

Each line segment cleaned is identified by an upstream and downstream manhole number. A work order is submitted for each job completed.

Manhole deficiencies are also noted in cleaning logs. Information about manholes requiring attention is provided to the supervisor and either a repair work order is issued or it is added to the capital repair schedule.

b. Pipe and Manhole Inspection

Planned manhole and pipe inspections are coordinated with the cleaning program and generally follow the cleaning schedule. However, as the City of Marion implements the first cycle of the PMP, and establishes cleaning frequencies and repair schedules, inspection by zoom camera will be used to help establish those cleaning frequencies. The cleaning, inspection and assessment program goal is to inspect the entire collection system within 5 years. During the first cycle of the PMP, prior to cleaning, a crawler camera is used to screen a pipe section to determine the cleaning frequency and whether a full CCTV screening is needed to assess its structural condition or other deficiencies. The Marion Sewer Department uses our camera to document:

- the structural condition of the pipe
- root intrusion
- grease
- protruding taps
- evidence of inflow and infiltration (I/I) or surcharging
- manhole pave-overs, and
- other deficiencies that factor into condition assessment

Planned video inspections are generally scheduled to follow the planned cleaning schedule. However, in the event of a blockage, a video inspection assesses the cause of the blockage. After the blockage is removed the line is evaluated with a pole camera again to determine if an inspection with a CCTV crawler is needed to assess the condition of the pipe. The Sewer Department uses a track camera for this assessment.

All newly constructed sewer lines are required to be CCTV inspected by the contractor or developer to verify as-built drawings and ensure the line has no construction defects. Additionally, all new pipes and manholes are required to be pressure tested to ensure tightness and prevent release of sewer odors and future infiltration of storm water. This inspection and testing process must be completed prior to backfilling and before the City of Marion will accept the infrastructure from the construction contractor.

Manhole inspections help keep our asset inventory up to date and are used not only to update collection system maps but to determine structural condition. During manhole inspections field crews take a complete inventory of each manhole including construction materials, ring size, depth to invert, flow conditions and evidence of problems according to the checklist. Information is recorded and used to schedule maintenance and repairs. A digital camera is used during the inspection to document defects.
Manhole inspection results are reviewed for condition rating. Those needing repair are placed on a priority schedule and routine repairs are coordinated as time permits. When repairs are recommended, as described below, work orders are created and entered into JobCal.

Repair crews are responsible for completing structural repairs to manholes. Repairs include invert work, frame and cover grade adjustment, and frame and cover replacement. More comprehensive repairs, such as complete relining of the manhole structure, are performed by outside contractors, as the work is put out for bid. As noted in the Equipment and Tool Inventory, the Marion Sewer Department maintains an inventory of frames and covers. Work is completed based on priority as noted on work orders which are tracked and completed in our work order database.

The independent contractor rehabilitates manhole cones and risers as identified by the inspections. Spectratech uses a three part system with a polymer outer layer to seal leaks and add life to manholes. Repairs are made on a priority basis.

c. Assessment
While routine cleaning and visual inspection are used to assess the condition of manholes and surface facilities, CCTV video inspections are the primary method used to assess the condition of

the sewer pipes. All records will be entered into and saved on our computer system.

The results from routine inspection and monitoring are used to prioritize areas needing CCTV inspections to assess pipe condition such as manholes with evidence of slow flow or surcharging. The assessment will be logged into the GIS database using conventional defect criteria.

Pipe condition information is used to determine short and long term maintenance strategies including increased cleaning, root treatment, sewer line repair, or replacement. The condition assessment helps establish the cleaning frequency and inform the Sewer Department's capital planning. As more condition assessment information becomes available the priority of capital projects may change. Sewer line repair or replacement projects are also coordinated with re-paving schedules.

Condition assessments document the following details and deficiencies:

1. Characteristics including pipe diameter, and age and type of material
2. Dips in line
3. Grease build-up
4. Root intrusion
5. Sediment accumulation and encrustation
6. Structural condition, including cracks, corrosion and erosion
7. Joint alignment and movement
8. Reverse slope
9. Obstructions
10. Deformations in line

The City of Marion Sewer Department, in conjunction with contract labor, will use a defect assessment table where each asset (pipe, manhole, pump, etc.) is rated for specific criteria (e.g., roots, grease, sedimentation, cracks, etc.). Based on the criteria ratings, an overall rating will be assigned for each asset. A ranking of each asset, based on its condition assessment rating will be used for prioritizing capital repairs and replacement.

d. Staffing and Equipment

The City of Marion Sewer Department is staffed with six employees trained for cleaning, inspection and assessment, and they are deployed in two to three person crews year round for cleaning. Inspection work is coordinated with the Superintendent, with onsite supervision overseen by the outside Lead Man. Inspections are reviewed by the Lead Man and Superintendent and they assess the condition of the section of the collection system in question.

At the beginning of each week crews are assigned a specific area of the collection system and are responsible for cleaning all lines in the assigned area within the specified time frame. Crews receive training on use of equipment and how to address problems that might be encountered while cleaning the collection system (roots, fats, oils and grease, etc)), including when to call in outside contract services.

Crews report back on a daily basis on progress and problems, including any inconsistencies

between the map and the actual sewer lines. These inconsistencies are noted and submitted with the log to the Lead Man for entry into the database and correction of mapping or location errors. As the crews perform cleaning and evaluation, the long term cleaning schedule for the entire sub-area is reviewed to determine if any lines designated for long term cleaning need to be cleaned before the crew moves to a new area. Cleaning crews perform manhole inspections during routine line cleaning and when removing blockages.

The following equipment is available for cleaning:
The Freightliner Vactor Truck is used to clean most lines. The standard attachment used is the jet power rodder. Jet rodding equipment is used to remove blockages from lines, and root saws are attached to the jetting equipment and used as needed.

4. GRAVITY LINE PREVENTIVE MAINTENANCE

a. Fats, Oils and Grease (FOG)

Grease and grease-like products can significantly increase the likelihood of sewer overflows. Grease can also cause blockages or aggravate blockages due to roots or structural deficiencies. Restaurants, cafeterias, and other food service facilities, as well as industrial facilities, can discharge grease as part of their normal sanitary flows that can lead, in time, to blockages, backups and overflows. The Marion Sewer Department routinely checks grease traps at all restaurants, along with testing of their discharge. The Department's recommendation is for each restaurant to have a grease trap cleaning program in place and most cooperate and send documentation when the tanks are pumped and cleaned. The discharge of fats, oils and grease (FOG) is regulated through our city ordinances and inspection program; however, backups can sometimes occur. Areas of the collection system with known grease problems are identified as problem lines in the Hach Jobs Cal maintenance program, and those lines are routinely cleaned.

The Marion Sewer Department, in assessing FOG in the collection system, found most blockages in the commercial and Food Service Establishments (FSE) areas were due to FOG. Although commercial facilities account for a high percentage of the grease blockages, they are not the only contributors of grease to the collection system, as residents in general also contribute grease to the system. The purpose of a FOG program is to minimize the introduction of fats, oils, and grease into the City of Marion's wastewater collection system. In implementing this program, known problem areas, reviews of line cleaning work orders and historical SSOs due to grease were investigated. The FOG program includes education for commercial /industrial facilities and residents, annual inspection and periodic sewer cleaning.

The City of Marion's sewer use ordinance prohibits discharges to the collection system liquid wastes containing grease in excessive amounts, or at levels that interfere with the operation of the system. The ordinance also authorizes inspection of facilities during normal business hours.

The Marion City Council enacted a policy and procedures requiring all commercial and industrial grease generating facilities to install and maintain a grease interceptor or automatic grease removal device, and maintain records of maintenance and operation. The policy also includes annual inspections of FSEs that will be done by the Sewer Department staff. If the grease interceptor has not been maintained (with documented removal of accumulated grease and cleaning), has been bypassed, or if significant grease is discovered within the service connection, the City of Marion will issue a letter to the owner giving notice of the ordinance/policy

non-compliance and requiring action be taken to prevent further discharge of grease into the system. If the non-compliance is not remedied within a timely manner the policy states that the enforcement authority of the sewer use ordinance may be invoked.

The City of Marion Sewer Department is able to clean the sewers in these problem areas at a high priority frequency. All emergencies are handled by the Sewer Department, and a 24-hour emergency number is available for calls after normal business hours.

To date, the FOG program has been mostly effective in reducing blockages due to grease, and the City of Marion has not needed to implement a permit program or require FSEs to monitor for FOG. The Marion Sewer Department evaluates data on a case by case basis to see if the cleaning frequency of some grease interceptors can be reduced.

b. Root Control

The Marion Sewer Department currently uses mechanical root removal for sewer lines with chronic root problems. Root saw attachments are standard equipment on cleaning trucks. When a crew encounters roots during routine cleaning a hydraulic saw is attached to the jet rodder and used to cut and remove the roots. The severity of the problem is recorded on the daily log, and if necessary, the pipe section is placed on the list for priority cleaning.

Cutting a tree's roots is like pruning the tree, and stimulates root growth into the system. Consequently, mechanical treatment must be repeated every year or two, which is factored into the cleaning schedules. Root control is also a major part of easement maintenance.

c. Service Laterals

While the Marion Sewer Department maintains the city sewer mains, the service lateral from the building to the main sewer line is the owner's responsibility. The Sewer Department will repair lateral taps that are located in the public right-of-way when repairing the main sewer. The Sewer Department may also televise a portion of the lateral if needed to help determine causes of problems in the sewer.

If service lateral problems are found to be the result of blockage or a collapse in the portion of the lateral under the property owner's responsibility, the field crew provides the property owner with suggestions as to how best solve their problem and also may provide names of plumbers in the area.

The Marion Sewer Department is evaluating our flow monitoring data to determine the amount of infiltration from laterals and will consider funding lateral rehabilitation if it proves to be cost effective. We are also considering adding a requirement that service lateral condition be evaluated as part of a home sale.

5. EASEMENTS and PAVING: MAINTENANCE AND ACCESS

a. Maintenance of Right of Way and Easements

Easements give the City of Marion the right to install and maintain sewer and water facilities on property not owned by the city. Easements in the City of Marion are usually no more than 50' feet wide, but run from several hundred feet to several miles in length. These easements are recorded as deed records that are accessed through the Williamson County courthouse.

Easements are important for our ability to operate and maintain our collection system. The City of Marion's goal is that all easements remain clear of any fences, buildings, gardens, trees, shrubs and extensive landscaping, to allow equipment access for maintenance of the collection system. The City of Marion is not liable to repair or replace any such items that are removed in the process of completing repairs or maintenance on the collection system. Crews are, however, instructed to work with the property owner whenever possible.

Maintenance of easements is accomplished in various ways. Easements on privately-owned parcels are often maintained by the owner. The Building Inspector refers construction questions as they arise to the Sewer Department. Easements on public land are maintained by the entity responsible for property upkeep. The Sewer Department uses signage on many of the manholes within easements to make it easier for field crews to locate them and for property owners to see their location. Manholes in easements are inspected as part of our ongoing preventive maintenance program.

b. Street Paving Coordination

During paving work, the Sewer Department prepares manholes prior to the re-paving of any street with sewer lines. This ensures that no manholes are covered in the process of paving the street.

It is the goal of the Marion Sewer Department to better coordinate the replacement of sewer lines with the paving schedule of the street department.

6. PUMP STATION/FORCE MAIN MAINTENANCE

The City of Marion owns and operates nineteen wastewater pump stations listed in table below. The collection system also includes approximately one hundred grinder pumps that service homes along the northeast section of Marion and potentially 50 more in an area in the southwest section. The pump stations owned and operated by the City of Marion are routinely checked by trained personnel with the Sewer Department. The maintenance for the grinder pumps and pump stations are the responsibility of the City of Marion.

The performance of the City of Marion pump stations is monitored through three time weekly inspections, along with systems at the station that notify employees when the station is in alarm. During these inspections, the lift station inspector reviews pump run hours, totalized flow, wet well levels and alarms. Every three months the Sewer Department collection crew pumps the wet

wells, removes grease build up, and calibrates the floats.

Inspection, maintenance and repairs are recorded at each station and logged into the computerized maintenance management system, Hach Job Cal (CMMS). If a problem or maintenance issue is encountered, personnel must report it in a timely manner directly to the supervisor for resolution. The CMMS generates work orders for repairs and routine maintenance. Repairs are a higher priority than routine maintenance.

The City of Marion Sewer Department has a Supervisory Control and Data Acquisition (SCADA) system for the Halfway Road pump station. This station receives all wastewater from the west side of Marion and sends the flow to the West Treatment Plant. The stations in the Crab Orchard Wildlife area are also monitored by the SCADA system. The SCADA system remotely monitors pump station operations and sends alarms to the personnel in the event of a malfunction or emergency. The SCADA system records all activities at a pump station and provides a hard-copy printout for backup documentation. The SCADA provides continuous status of pump station operations for the following items:

- Number of pumps in operation
- Status of pumps (including operational alarms)
- Current pumping flow rate
- Historic flow rate (24 hour Flow Chart)
- Pump start / stop cycles
- Power status (including power failure alarms)
- Wet well conditions (depth, lead / lag elevations, etc.)
- Personnel status (entry / exit alarms)

Pump Station Locations

Pump Station Location	Description	Inspection Frequencies*
Eductor (Pickett Lane)	Submersible Pumps	3X Week
Parks (East Main Street)	Pump Station	3X Week
Parham Street	Pump Station	3X Week
Ray Smith (Illinois Street)	Pump Station	3X Week
Fosse Park (Clark Street)	Submersible Pumps	3X Week
Holmes (Melanie Lane)	Pump Station	3X Week
Halfway Road	Submersible Pumps	3X Week
Boswell (Belinda Drive)	Submersible Pumps	3X Week
Moore Park (Whipporwill Lane)	Pump Station	3X Week
Westernaire (Lakeview Drive)	Pump Station	3X Week

Industrial Park (Water Tower Rd)	**Pump Station**	**3X Week**
Pentecoast Road	**Submersible Pumps**	**3X Week**
Airport	**Submersible Pumps**	**3X Week**
Airway Drive	**Submersible Pumps**	**3X Week**
Crab Orchard #3	**Submersible Pumps**	**3X Week**
Crab Orchard #2	**Submersible Pumps**	**3X Week**
Crab Orchard #4	**Submersible Pumps**	**3X Week**
Southwest (Wildcat Drive)	**Pump Station**	**3X Week**
Gribbles (Heartland Drive)	**Pump Station**	**3X Week**

Manufacturer Operation and Maintenance (O&M) manuals for equipment are located in each station and a copy in the wastewater plant office.

Pump rebuilding, motor rewinds, and other repairs for the pump stations are usually contracted to Flanders Electric in Marion. Repairs to motor control centers, flow meters, remote monitoring equipment, valves, and macerators are typically repaired by the Sewer Department maintenance crews. In general, any replacement parts that are difficult to acquire are kept in stock by the Sewer Department; other parts are obtained from local vendors or the manufacturer's service center. As pumps and other parts are replaced the Sewer Department makes an effort to standardize pumping station equipment as much as possible.

Whether repairs are made by local vendors or by Sewer Department personnel, all repairs are recorded and tracked with the Hach Jobs Cal database.

a. Mechanical and Electrical Maintenance

The size of the pump station and its related equipment determine its specific mechanical and electrical maintenance needs. The supervisor is responsible for incorporating the routine maintenance of each pump station into the Hach Jobs Cal. The maintenance personnel use manufacturers' Operation and Maintenance manuals to establish action items for pump station equipment. A general description of weekly and bi-annual maintenance performed on pump stations by the Sewer Department is listed as follows:

DAILY	**Electrical Maintenance/Inspections**
Review pump run hours Review totalized flow	Ensure all breakers are on Ensure that all switches and controls are in

Check wet well levels, check for debris, turbulence or unusual noise Check alarms Ensure that all switches, controls and valves are in the correct position Pick up litter, general housekeeping Record findings in log book	the correct position
Weekly	
Log pump hours Check hydraulic levels Operate each pump Check drive belt Check bearings and packing Check for pump vibrations, unusual noise, and excessive heat Check pump and pump base connections Check chart recorder for routine pump performance Check valve operations and signs of leakage Lube and grease equipment (as required by manufacture) Check, clean and maintain property Check building security	Check chart recorder Check Motor Control Centers (MCC) Check level controllers Check electrical service feed Check remote monitoring equipment Check indicator and alarm lamps Check general electrical items (lighting, etc.) Check and release intrusion alarm
Monthly	
Pump and Clean wet wells on a three month schedule	Check back up generator Exercise stand by power
Bi-Annual	
Replace hydraulic fluids and oils (as required by manufacturer) Inspect pumps (oil levels, seals, packing, bearings, etc.) Replace packing Inspect pump impellers and clearances Inspect discharge piping Check outflow pressure Calibrate gauges (including pressure gauges used in monitoring) Check for corrosion problems Exercise check valves Check air release valves Check floats/bubbler system (clean and/or replace) Inspect building and grounds Check operation of building heat and fans Inspect HVAC equipment	Inspect internal Motor Control Center components Check insulation resistance Inspect & grease electrical contacts Inspect electrical pump cables Inspect electrical breakers Perform amperage readings on equipment Check MCC for proper operations Check Generator: oil level water level fuel level inspect hoses and belts check piping for leaks check battery condition

Annual	
Service and calibrate all instrumentation: flow meters, level sensors, alarms, elapsed time meters and telemetry equipment	Alternate Power Sources checked and run as part of emergency drill

Capacity and discharge head in the pump stations are reviewed annually, following confirmation that the pumps are in good working order. Changes in capacity and discharge head are evaluated to determine whether cleaning of the force main is warranted.

All mechanical and electrical maintenance activities are recorded at each station, entered and tracked by the Hach Job Cal database. The Hach Jobs Cal software generates work orders for weekly, monthly, quarterly, annual and bi-annual preventive maintenance actions. These work orders are left in an "open" format until maintenance crews enter completion comments pertaining to the work order. Any problems or maintenance issues noted by crews are reported to the supervisor for resolution.

b. Force Main Maintenance

The City of Marion Sewer Department currently has twenty force mains in the collection system with a combined length of approximately twenty miles. The Halfway Road and the Wildlife Refuge force mains have air release valves located at the high points of their lines. The remaining force mains are not long enough or are too old to warrant air release valves. Our system includes a total of twelve air release valves. The Sewer Department inspects and maintains these air release valves on a quarterly schedule, and all air release valves and valve vaults are inspected for signs of corrosion, connection point leakage, or improper operating characteristics.

The pressure on the discharge side of the pump is used to determine the need for force main cleaning. If the backpressure is more than 25% greater than the expected total operating head, the discharge pipe will be cleaned. Pressure gauges are calibrated during the inspection.

c. Private Pump Stations

The City of Marion currently has only one (Spillertown) private pump station, and this station discharges an average of 40,000 gallons per day to the collection system. This station is owned and maintained by the Village of Spillertown.

Private Pump Stations

Pump Station Name	Location	Owner	Owner/operator contact information
Spillertown	N. Spillertown Road	Village of Spillertown	Village of Spillertown

d. Corrosion control

The dissolved oxygen content of the wastewater is often depleted in the wetwell of the Halfway Road pumping station. This wastewater passing through the force main not only lacks oxygen,

but often contains sulfides. These sulfides have led to corrosion at the headworks of the west treatment plant, along with offensive odors. Frequent cleaning of the wetwell, along with the application of chemical treatment at both upstream and downstream wetwells is required to prevent solids and grease buildup and minimize corrosion due to the high concentration of sulfides.

7. REACTIVE MAINTENANCE

This chapter outlines the process used by Marion Sewer Department to respond to non-overflow, unplanned maintenance needs in our collection system. It also provides an overview of responsibilities for emergency events. While Chapter 3 outlines the Sewer Department's preventive maintenance and details response procedures for emergency sewer overflows, this chapter is written to address those unscheduled maintenance events that don't result in overflows or backups of sewage into basements.
The following programs are typically utilized in a reactive maintenance situation:

- Hach Jobs Cal - information management system
- Equipment and supplies
- Customer service
- Water Quality Monitoring
- Pump station programs
- Sewer Overflow Response is always a priority situation, details are provided in the City of Marion Sewer Department's Sewer Overflow Response Plan (SORP).

Responsibilities for reactive maintenance are assigned by the Sewer Department Superintendent who assigns the tasks based on level of priority for response.

a. Corrective Maintenance

Most repair needs are identified while conducting routine maintenance, inspections and assessments. Because there is such a wide range of potential unexpected events that it is not possible to prescribe the appropriate repair for every possible scenario, the Sewer Department has established a prioritization scheme for determining the timing of repairs. This is based on the types of problems that have occurred in the collection system in the past or could occur in the future. While this contingency analysis focuses on system upsets that would not result in immediate sewer overflow, the response timing is based on the potential for a resulting sanitary sewer overflow.

Low-risk items are planned for run-to-failure, and as such, are not part of the PM Program. These items are replaced when they fail. When assets critical to the process fail, they are scheduled for corrective maintenance either on an urgent or routine schedule. Some of these repairs are handled under the operations and maintenance account, and some must be put in as capital improvements as part of our asset management activities depending on asset cost and life expectancy.

Corrective maintenance repairs include (but are not limited to):

- cleaning to eliminate flow problems that are noted during inspections
- spot repair or replacement of a pipe that shows signs of deterioration
- replacing a rattling or failed manhole cover
- repairing or replacing a pump that is becoming clogged or has been damaged by debris
- responding to, investigating and mitigating customer complaints
- repairing system parts subject to vandalism

b. Scheduling

Scheduling of repairs run the range from repairing components found to be in substandard condition during inspection, immediate repairs to pump stations that are malfunctioning, to major, capital-intensive, repair projects, such as a manhole-to-manhole pipe replacement or rehabilitation. An emergency, however, always supersedes scheduled maintenance. Timing of other repairs is done by priority, cost and size of project. Major replacement or rehab may be capitalized outside of the annual operating budget when such needs arise due to the urgency and scope of the project.

c. Tracking and Recording Repairs

The Sewer Department staff document corrective maintenance needs in the work order system at the time of the event. Corrective maintenance tasks are recorded when completed and the Sewer Department lead man (or designated staff) inputs them into our database. CCTV or other failure analysis may also be done by staff as a corrective maintenance task after a problem occurs. This is used to diagnose the cause of the problem and recommend repairs and schedule changes if needed. Findings may lead to a spot repair of the pipe, root cutting, root foaming with an herbicide, re-cleaning for grease or debris removal on a periodic preventive basis, and if so, these tasks are included in an update of our Cleaning, Inspection and Assessment schedule.

d. Complaint Response

The Marion Sewer Department is responsible for responding to sewer service complaints. Complaints are generally related to sewer stoppages, overflows, or odors. Response is performed by the collection system staff during work hours and by call out during off work hours. Normal hours of operation are 7am to 8pm Monday thru Friday, and 7am to 3pm weekends and holidays. These hours of operation and emergency phone numbers are provided on the telephone answering system for the Sewer Department at 618-993-5363, and on our website www.cityofmarionil.gov. Complaint response includes both assessing the complaint and resolving the problem. The majority of our complaints are related to stoppages in sewer lines. A crew is dispatched for response to the problem, and if it is a city main that is stopped a cleaning crew will be dispatched to remove the stoppage.

The Sewer Department tracks these complaints and response activities in our database, evaluates response time, trouble spots and, and uses the information to assess our performance, update this plan and prioritize repairs.

e. Reactive Response Summary

For detailed response information, refer to Sewer Overflow Response Plan. This chapter does not cover overflow response, in the event of a spill or overflow, see the SORP and contact the following:

Response Coordinator & Alternate
Brent Cain, Superintendent
Office – 618-993-5363
Home – 618-922-5363

Rick Herring, Collection System Lead Man
Office – 618-993-8309
Home – 618-922-8309

David Williams, Plant Lead Man
Office - 618-993-5363
Home - 618-694-3056

8. EQUIPMENT AND TOOL INVENTORY

a. Essential Day-to-Day Items

The Marion Sewer Department provides operations and maintenance crews with the essential work related items they use on a day-to-day routine basis. Should new or replacement equipment or tools be needed, the crew leader notifies the lead man. The lead man will issue the crew leader stocked items. For non-stocked items, the lead man or superintendent advises the crew leader of a local vendor and issues a purchase order for the needed item(s). The crew leader will then procure the requested items through the local vendor.

b. Spare Equipment and Tools

The Marion Sewer Department keeps a limited supply of spare equipment and tools for personnel. Equipment and tools are purchased from local vendors when at all possible, but some specialty items require purchase from outside the area. Non-bid equipment and tools can be purchased in amounts up to five thousand dollars, over that amount only after city council approval.

The large equipment and tools needed for certain tasks (large volume or backup pumps) are obtained through current rental contracts or if necessary, purchased by the Sewer Department if it is determined that there is a need for a permanent acquisition of the item. .

An inventory of the equipment and tools used by the Marion Sewer Department to maintain the wastewater collection system, and a list of supplies and essential spare parts necessary to be kept on site for normal and emergency use is available on request. The estimated remaining life of the equipment inventory was calculated based on the date of manufacture, an estimate by the Sewer Department of the useful life expected, and factors that might be expected to extend or reduce the life of the equipment (e.g., repairs or hard use). The equipment in the inventory requires varying degrees of time for replacement. Specialized attachments are often used with these tools to perform specialized maintenance tasks such as root cutting and general sewer maintenance. .

Current Equipment and Tool Inventory – Available on Request

9. CAPACITY MANAGEMENT

a. Capacity Background

The City of Marion's collection system has certain areas in town that have exceeded design capacity to contain wastewater flows from the city. The following tables and discussion summarize the state of our system capacity to carry and contain flows.

Sanitary sewer overflows and building and basement backups caused by capacity restrictions in Marion's collection system have historically occurred in the following collection system locations:

Date	**Location of Capacity Problem**	**Cause of Capacity Issue**
	Boyton and S. Market St	Infiltration/Inflow (I/I)
	Boyton and Park St.	I/I
	Calumet and Hemmingway	I/I
	Calumet and Circle Drive	I/I
	Allen and Market St	I/I
	Market and Mitchell St	I/I
	Market and Jones St	I/I
	Market south of Jones	I/I
	Liberty and Mitchell St	I/I
	Hamlet and White St	I/I
	E. Main east of Parks LS	I/I
	Bentley and Central St	I/I

The Marion Sewer Department has or will implement the following measures to remedy and/or alleviate the capacity issues identified in the above table:

- ***Non-structural rehabilitation measures i.e. manhole and sewer testing & sealing programs***
- ***Structural rehabilitation measures i.e. elimination of pipe restrictions; elimination of storm sewer--sanitary sewer cross connections, storm sewer catch basin redirection; manhole, sewer, and private lateral replacement; construction of relief sewers, force mains, pump station expansions etc.***
- ***Development and calibration of hydraulic models***

- *Evaluation of the extent and capacity of storm water collection systems*
- *Implementation of extraneous flow and illicit discharge home inspections during property transfers*
- *Implementation of private extraneous flow incentive or disincentive (fines or flow surcharge) programs*
- *Increased cleaning to maintain collection system capacity*
- *Implementation of Fats, Oils & Grease programs*
- *Periodic review of flows received from satellite communities*
- *Implementation of sewer/DPW reviews of building permits*

In light of ongoing capacity issues, the City of Marion plans to implement or consider the following measures to remedy and prevent capacity restrictions that result in surcharges and sanitary sewer overflows in the collection system:

b. Sewer Capacity Certification/ Connection Policy

Sewer Capacity Certification is a process where any new development requiring the connection of its sanitary sewer service to the Marion sewer system is reviewed to determine whether adequate sewer system capacity exists to convey the new wastewater flow from the proposed development to our wastewater treatment facility. A capacity certification analysis by a professional engineer is required for all new business developments and subdivisions.

The City of Marion is considering a plan that, separate from the connection fee, developers of newly-constructed homes and businesses be required to pay a sewer capacity charge for removal of infiltration/inflow (I/I) from the system. The fee is based on removing an amount of I/I equivalent to an as yet undetermined times the requested additional wastewater flow. The monthly capacity charge would be assessed for a prescribed number of years after connection, but property owners would save a substantial percent of overall charges if they choose to pay a lump sum upfront.

c. Lateral replacement program

The City of Marion has nearly 120 miles of sewer mains and an almost equal length of private service laterals. The City is considering a policy that remedial work to remove infiltration within a sewer shed will also include private service lateral investigation and replacement if necessary. The City of Marion would pay up to (as yet undetermined dollar amount) to repair or replace private service laterals. The Marion Sewer Department would CCTV the service lateral at no cost.

10. RESOURCES AND BUDGET

a. Budget Process

The Marion Sewer Department's budget process complies with the City of Marion budget cycle, which requires that the annual budget be completed by April 30th of each year. For the Collection System operations and maintenance budget, the process begins with last year's numbers and projected needs for twenty years into the future.

The Sewer Department works closely with the Treasurer to prepare the budget for passage by the City Council.

b. Rate Setting, Budgetary Policies and Financial History

The City of Marion's rate-setting policies are based on the following principles:
1. Rates and fees will be based on the actual cost to deliver each service.
2. Current rates must be sufficient to cover current costs and to meet all bond covenants.
3. Future rates may include funding for Capital Improvement Plan projects included in an annually updated twenty-year financial plan (both operating and capital).
4. Rate increases will be implemented at the gradual increase of 3% per year, avoiding large one time rate increases.

The Marion Sewer Department operates as a division of the City of Marion. The Sewer Department's revenue is generated from user fees, debt service fees, connection fees from new customers, fines, interest earnings, and other income from outside agencies.

The monthly user charge has two components: a debt service charge and a volume charge based on monthly water use. The Marion Sewer Department's expenses included operation and maintenance and debt service.

c. Historical Rate Review

Our current sewer rate structure is based on metered water use. Customers are billed monthly for wastewater services based on metered water use after the first 2000 gallons used. In addition to flow charges, customers are also assessed a debt service charge of $9.50 to recover fixed costs. See Table below for a summary of user rates for the last three years.

The comprehensive nature of the Preventive Maintenance program will result in increases in the sewer user rates to implement our preventive maintenance and asset management program. Although the expectation is that reactive maintenance costs will decrease as the preventive sewer cleaning program is implemented, an initial increase in costs to initiate the preventive program and establish baseline cleaning, inspection and assessment schedules is expected. As CCTV data is provided, future rate increases to address capital improvements may also be expected.

The following table shows the City of Marion's sewer rates over the last three years.

Sewer User Fee History

Fiscal Year	% Rate Increase	Base Charge (up to 2000 gal) Including debt service	Residential Rate 1st 5000 gallons used per 1000 gallons	Debt Service Charge
2014	3%	$15.23	$3.23	$9.50
2015	3%	$15.40	$3.33	$9.50
2016	3%	$15.57	$3.43	$9.50
2017	3%	$15.76	$3.53	$9.50
Avg. Increase	3%			

d. Operating and Maintenance Expense

Estimated operating expenses for FY 2017 totaled $ 3.1 million dollars. This is a 13% increase over the FY 2016 operating budget of $ 2.7 million, with a large part of the increase due to capital improvements and the implementing of the CMOM plan.

Operating and maintenance expenses include:

- Employee salary and compensation
- Operating supplies
- Utilities
- Repair and maintenance
- Professional services
- Routine capital outlay
- Debt service expenses for repair and replacement

Professional Services includes planning and engineering studies for replacement projects.

Contractor Services includes contractual work for cleaning sewer lines and manholes, CCTV, and improvements to the collection system map.

Routine Capital Outlay includes items that are considered capital assets and are purchased from annual operating revenue rather than through bonds or the capital reserve fund. These items, such as vehicles, specialized maintenance equipment, pumps, motors, office equipment and other smaller items generally cost less than $ $100,000.

Debt service is the annual principle and interest payments for bonds, loans and other fiduciary instruments owed by Marion Illinois wastewater department. The debt service supports capital improvement projects.

e. Capital Improvement Program Overview

The Marion Sewer Department is in the very beginning of implementing its CIP. This is the first year that we have had money available to start work on some of the I/I problems in Marion. We have money available primarily from Tax Increment Financing (TIF) bodies and that money is to be used to rehab sewer lines and lift stations that serve those TIF bodies in the city. This money will be available for the next 8 years at a minimum. Outside of the TIF bodies, the Marion Sewer Department has some excess money from our debt service account to pay for some rehabilitation of our sewer system.

The Marion Sewer Department has a few ongoing projects in its Capital Improvement Program. The Sewer Department develops a long-range CIP program covering a 5-year period that is updated annually. The CIP describes each proposed project, the budgeted cost for the project and the financing source(s). The CIP was primarily funded with Tax Increment Financing (TIF) dollars, plus additional funds from the capital reserve fund. The 2016 TIF was in the amount of $ 2,500,000. Additionally, $100,000 was set aside from O&M to perform manhole rehab and sewer lining projects.

The capital reserve funds result from the balance of funds remaining after the payment of all operating and maintenance, debt service and other expenses. The capital reserve fund also accounts for the depreciation expense in the O&M budget. The reserve funds are primarily used for:

- Non-bond funded capital projects
- Additional funds for bonded projects
- Emergency repair and maintenance

The available reserve funds generally range from $ 100,000 to $ 120,000 annually. The amount varies based on the amount of excess unallocated debt service we have.

f. Capital Improvement Plan

The total 5-year CIP exceeds $4,000,000. The current pace of project completion will grow with the availability of funds.

Estimated total debt service for the fiscal year is $ 910,000, which is 30 % of the O&M budget.

1. Population Growth

Marion has been growing steadily for a number of years. In the 1990 census the population of Marion was 14,500; by 2008 the population had grown to 17,300. The long range population growth for Marion is expected to continue at this rate.

2. Capacity and Fees

Marion currently collects fees primarily to fund O&M and to pay debt service. Any money available above and beyond those costs is used for capital improvements and for use on projects to correct I/I in the sewer system. Any other monies that are made available through TIF districts

or others will be used to rehabilitate the collection system on a need based system in those areas.

3. Capital Facilities Projects and Financing. The total cost of the planned capital and non-capital projects during 5 the year period is $4,000,000. One project is classified as a capacity project, sewer main lining and manhole lining, at a cost of $ 3,100,000. Another project is a lift station rehab at a cost of $250,000 and the balance of $650,000 will be spent on CCTV and other testing.

4. Operating Impact of Service Capital Improvements. The cost of operating the proposed capital improvement projects during the next five-year period is estimated at $4,000,000

11. SEWER SYSTEM PREVENTIVE MAINTENANCE PLAN UPDATES

A. Plan Update Process

The Marion Sewer Department will complete as needed reviews of our Preventive Maintenance program and this plan beginning in 2016. The review will consider the progress that has been made in developing and implementing our Preventive Maintenance Program, the results of our monitoring program described in Section b., below, and will incorporate updates to this Plan including:

- Changes to organizational structure, information management, contacts, and system maps
- Changes to information on the collection system, such as the size and age of pipes, to incorporate information on repairs completed during the year
- Incorporation of successful cleaning, inspection and assessment program improvements during the past year
- Changes to our Sewer Use Ordinance and Fats, Oils and Grease programs
- Updates to our pump station inspection and maintenance program
- Updates as we evaluate our collection system capacity
- Budget and Capital Planning updates

The sewer inspection history of any segment of pipe is retrievable electronically and the data will be used to develop condition ratings. This aids in prioritizing future sewer rehabilitation projects, maintenance activities, and updating this plan. The latest version of our Preventive Maintenance Plan will be made available at our website and old versions will be collected and recycled.

b. Monitoring, Measurement, and Program Modifications

As noted in Chapter 1, the City of Marion Sewer Department maintains complaint and blockage records in a log, maintains our records of cleaning and other preventive maintenance activities, and records problems (e.g., excessive debris, observed manhole defects) identified through regular sewer maintenance activities in our Jobs Cal maintenance program.

The sewer inventory, mapping, and maintenance database currently under development and discussed in Chapter 1, tracks and utilizes records related to any sewer segment in our system. Using the call logs and inspections of crew, complaints and service are recorded and linked to preventive and reactive maintenance activities.

The information available in the SSO reporting system is used to help measure the effectiveness of our program by tracking various parameters related to service calls, maintenance, and inspection activities. We will also measure our effectiveness by comparing SSO trends from previous years and identifying system components that continually contribute to system failures. Specifically, we will track the following parameters with which to measure the effectiveness of this Plan and its effectiveness in reducing SSOs and meeting the goals we set (described in Chapter 1):

- Number of SSOs per year
- Volume of SSOs per year
- Number of dry weather SSOs per year
- Number of SSOs per year by cause (e.g., roots, grease, pipe failure, I/I, pump failure or other deficiency, etc.)
- Response time to SSOs and other service calls (time from call received to first responder arriving on site)
- Length of gravity sewers cleaned annually
- Length of gravity sewers CCTV inspected annually
- Record of pump station maintenance work orders completed annually
- Percent of system rehabilitated (repaired or upgraded) each year
- Number of FOG inspections and compliance with FOG requirements
- Improvements in capacity due to reductions in I/I
- Service reliability as measured by history of complaints in a specified area
- Safety history/incidents
- Ratio of funds spent on preventive maintenance versus reactive and emergency response

This information will be assessed and reported to the Sewer commissioner and City council during our annual update as we keep the City of Marion officials and coordinating departments up to date with our infrastructure work. Changes to this Preventive Maintenance Plan will address issues identified through this monitoring program and during our update and review.

SEWER OVERFLOW RESPONSE PLAN

FOR

City of Marion Sewer Department
1321 S. Van Buren Street
Marion, Il 62959

10-1-2016

Brent Cain
1321 S. Van Buren Street
Marion, Illinois 62959
618-993-5363
wastewater@cityofmarionil.gov

SEWER OVERFLOW RESPONSE PLAN

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1. RESPONSE INFORMATION

RESPONSE COORDINATOR & ALTERNATE

Brent Cain, Wastewater Plant Superintendent
Plant – 618-993-5363
Home – 618-922-5363

Rick Herring, Lead Man
Plant – 618-993-5363
Home – 618-922-8309

David Williams, Lead Man
Plant- 618-993-5363
Home-618-694-3056

GOVERNMENTAL RESPONSE UNITS

1.	Marion Fire Department	Tel. 911
2.	Marion Police Department	Tel. 911
3.	Lifeline Ambulance	Tel. 911
4.	Williamson Co. Emergency Management	1-618-998-2123
5.	Ameren Illinois Power Co.	1-800-755-5000
6.	Heartland Regional Medical Center	618-998-7801

The first response step when a Sanitary Sewer Overflow (SSO) occurs is to notify the Marion Sewer Department – they are responsible for managing the response and making key decisions. Their responsibility is to assess the situation and initiate a series of response actions based on the type and severity of the event. The table below identifies the key personnel who will be responding in emergency situations.

Responsibilities Chart

Name and title	**Responsibilities during a SSO response**	***Contact numbers***
Brent Cain Superintendent	Responsible for overall management and decision making for the sewer collection system. Takes the lead for managing the response to a SSO, providing information to **regulatory agencies**, the public and news media. Responsible for determining the need to contact Fire department (for response to toxic spills and containment booms, eg), local conservation department(s), and/or town officials.	Phone: 618-993-5363 Cell: 618-922-5363
Rick Herring Collections Lead Man	In charge of operating the collection system, performing inspections, maintenance and relaying critical information, assessing facilities, and providing recommendations to the Superintendent. Responsible for organizing crews for response.	Phone: 618-993-5363 Cell: 618-922-8309
David Williams Plant Lead Man	Responsible for administrative functions in the office including receiving phone calls and keeping a log of events. Will provide a standard carefully pre-scripted message to those who call with general questions. Additional information will be released through the Superintendent..	Phone: 618-993-5363
Field Staff	Delivers emergency notices and supports collection system operator.	Phone: 618-993-5363

1. Recording the Report of Possible Sanitary Sewer Overflow (SSO)

Generally, telephone calls from the public reporting possible sewer overflows/ basement back ups are received at the Marion Sewer Department, or Marion City Hall.

For phone calls reporting overflows and backups, a member of the department staff obtains all relevant information available regarding the overflow including:

a. Time and date of the call;
b. Specific location of the overflow;
c. Description of problem (e.g., what is overflowing, extent of spill, if the cause is obvious, etc.);
d. Time possible overflow was noticed by the caller;
e. Caller's name and phone number;
f. Observations of the caller (e.g., odor, duration, back or front of property);
g. Other relevant information that will enable the department staff to quickly locate, assess and stop the overflow.

2. Confirming Overflows

A member of the sewer response crew is dispatched by the Sewer Supervisor to confirm the overflow.

3. Reporting Overflows

The Sewer Department completes a Sewage Overflow Report within 24 hours of the sewer overflow confirmation and provides the information by phone to the Illinois EPA Regional Office.

2. INTRODUCTION

Our collection system is an integral part of the City of Marion's unseen infrastructure, taking sanitary wastes from residences, commercial establishments and industry to the wastewater treatment facility, located at 1321 S. Van Buren Street in Marion Illinois. If the capacity of the collection system is exceeded, or if blockages occur, overflows may result. Untreated wastewater overflows that occur upstream of the treatment plant are called Sanitary Sewer Overflows (SSOs). SSOs are a threat to public health and the environment because the SSO may discharge pollutants such as pathogens, floatable materials, toxics, and other pollutants, all of which may impact public health, drinking water supplies, water quality and/or aquatic ecosystems.

2.1 Goals

The goal of this Sewer Overflow Response Plan (SORP) is to document Marion's plans for mitigating or preventing potential emergency overflows whenever possible, to prepare the City's personnel and responding departments to deal efficiently with the effects of such events, and to protect health, environment, and property.

Quick response to an SSO will minimize the overflow impacts on public health, water quality, the environment, and customer service. This SORP is designed to ensure that appropriate crews are immediately dispatched to all reported SSOs to stop the overflow as quickly as possible; to minimize the effects of the overflow on public health and the environment; to minimize the impact of the overflow on collection system operations; and to report the overflow to the appropriate regulatory agencies, and to the public when warranted. The objectives of this plan include controlling waste discharge and providing procedures for managing sanitary sewer overflows, preventing harm to public health and the environment, and satisfying regulatory and reporting requirements.

Additional objectives of the SORP are to: provide appropriate customer service, protect collection system personnel and the wastewater treatment plant, protect all parts of the collection system, and protect private and public property beyond the collection and treatment facilities.

This plan will be updated as necessary to reflect any changes in staffing or notification requirements, including contact numbers. It should and must be revised as insight and experience dictate.

2.2 This SORP is organized into the following sections:

Overview (Description of Collection System)
Overflow Notification procedures
Response to Overflows
Overflow Reporting

3. OVERVIEW

This section provides a general description of the City of Marion's collection system and critical facilities. Response personnel must be familiar with the collection system and its components to effectively execute the response procedures described in this plan. For further details on the collection system, crews are directed to our Preventive Maintenance Plan (PMP).

The City of Marion has a population of approximately 18,500 of which approximately one hundred percent are served by our collection system. The covered area extends from Longstreet in the northern boundary to Wildcat Drive on the south; from North Hackmore Road on the east side to route 148 on the west. The sewer system is divided into forty sections, all of which feed into the wastewater treatment facility located at 1321 S. Van Buren Street in Marion, Illinois. The collection system map provides detail.

The City of Marion's wastewater collection system includes the following components: 2,505 manholes; approximately 628,000 linear feet of sanitary sewers; approximately twenty miles of force main; nineteen pumping stations, and nearly one hundred fifty grinder pump stations. The system is comprised of components ranging in age from the mid 1900's to those installed this year. Materials include clay pipe, cement, ductile iron and plastic.

The City of Marion's collection system contains several critical facilities. Depending on the specific critical facility, a sewer system failure could potentially impact wetlands, surface waters, basements and street flooding. Critical collection system facilities are described later in this section.

3.1 Specific Known Vulnerabilities

Certain areas of Marion are known to be more vulnerable to system blockages and overflows than others and require additional maintenance. These vulnerable areas are listed in the priority cleaning schedule in Section 3. These areas are cleaned on a regular basis and checked frequently during large rain events.

Flooding in low lying areas has been the cause of some problems in the past. Advanced weather prediction is not always accurate and extreme precipitation can develop without adequate warning. High intensity storm events can also impact areas in the city that are located above designated flood plain.

A review of past maintenance records and citizen complaints indicates that roots, FOG and some main installation issues have consistently contributed to the occurrence of SSOs in most of the problem areas. The Marion Sewer Department has increased maintenance (as described in the PMP) in these areas in response to the problems identified.

3.1.2 Pump Stations

The City of Marion has nineteen pumping stations in the collection system. Of the nineteen pumping stations, there are 2 major pumping stations:

- Halfway Road Lift station. Collects flow from everything west if I57. (1900 gallons per minute)
- Southwest Stormwater Holding Pond. Collects flow from the central, older part of Marion.(500 gallons per minute)

The 17 other pump stations within the collection system primarily serve as lift stations with pumping capacities ranging from 100 to 400 gallons per minute.

3.1.3 Force Mains

The City of Marion waste water collection system includes twenty force mains with a total length of approximately twenty miles. The force mains range in age from 5 to nearly 60 years. The location, size and material of the force mains along with the location of the pump stations will be included in our new GIS mapping system.

4. OVERFLOW NOTIFICATION PROCEDURE

4.1 Overview

When an SSO or other collection system emergency occurs, a number of individuals must be notified. Depending on the size and severity of the problem, different notifications are needed. While minimum notification procedures are in place for all overflows, more specific notification procedures are required for more severe overflows. For example, a small, contained overflow with no impact to a water body or other sensitive area will have fewer notification requirements than an overflow that has discharged into surface water.

4.2 Receipt of Information Regarding an SSO

An overflow may be detected by City of Marion employees or by others. The Marion Sewer Department is the primary department responsible for responding to SSOs. The Sewer Department is responsible for acting based on received phone calls or reports of possible sewage overflow from the wastewater collection system, and providing immediate response to investigate and/or correct the problem.

Generally, telephone calls from the public reporting possible sewer overflows are received at the wastewater treatment plant. Information is collected and dispatched as described in Section 1, Response Information.

A member of the Sewer Department will confirm the overflow and implement measures to stop the overflow.

If the overflow may affect beach or swimming areas, or public drinking water intakes, the Sewer Department shall notify the Illinois EPA Regional Office by phone within two hours of becoming aware of the discharge.

If the overflow results in a fish kill, the Sewer Department shall notify the Illinois EPA Regional Office by phone within two hours of becoming aware of the results of the fish kill.

The Sewer Department superintendent is responsible for reviewing, updating and signing the final Sewage Overflow Report. Sewage Overflow Reports, clean up information and notification Reports are kept in the office of the Superintendent and reviewed periodically for recommendations for trouble spots and amended cleaning schedules.

Pump/lift station failures are monitored by alarm system and received by the Sewer Department. The operator on duty immediately conveys all information regarding alarms to necessary personnel to initiate the investigation.

4.3 Notification Matrix

The notification matrix (shown below) outlines the responsibilities of staff for notification when a sanitary sewer overflow occurs. This also provides a flow chart to help collection system staff and crews understand the notification process.

Notification Matrix

	Operator/Dispatcher Contacts Crew and Superintendent	Supervisor/Superintendent Brent Cain 618-993-5363 618-922-5363 CONTACTS this column:		
		In touch with Dispatched crew(s)	**Contacts Outside Contractor, if necessary**	**Contacts Fire Department or emergency responders as needed:** 911
	Crew Goes to site Keeps in touch with Superintendent and Dispatcher	**Illinois EPA** **618-993-7200**		
		Franklin Williamson Bi-County Health Dept **618-993-8111**		
		Local Health Department **618-993-7010**		
	Crew files logs and reports to Superintendent	**Emergency Management Agency** **618-993-2123**		

5. RESPONSE TO OVERFLOWS

Response procedures provide guidance for the evaluation, mitigation and correction of the conditions that are causing or contributing to an unpermitted discharge of untreated waste water. The primary objectives of these emergency response procedures are to provide standard protocols, minimize risk, and protect public health and the environment.

The Sewer Department superintendent or lead man dispatches sewer maintenance personnel with appropriate equipment to confirm and contain the overflow, and determine the cause. Crews and equipment are available to respond to any SSO locations. The Marion Sewer Department currently has eleven crew members available for response at any time. The Sewer Department generally relies on cell phone communication to dispatch personnel to the scene of the overflow.

All maintenance personnel are placed "on call" by the superintendent in the event extra crews are needed.

5.1 Preliminary Assessment

Upon arrival at the reported sewer overflow site, and based on observations, the sewer response crew may request additional personnel, material, supplies, and equipment from the department, or other city departments.

In all cases, response crews report their findings, including possible damage to private and public property, to the superintendent or lead man upon making their investigation. If the superintendent or lead man has not received findings from the field crew within a timely manner, the superintendent or lead man contacts the response crew to determine the status of the investigation.

The lead man or superintendent will visit the site of the overflow, if possible, to ensure that provisions of this overflow response plan are met. The superintendent is responsible for informing the Illinois EPA Regional Office of all SSOs within 24 hours of becoming aware of the release.

If hazardous substances are suspected in the overflow, personnel are to contact the Fire Department via 911 immediately.

5.2 SSO General Equipment

The following items are available to response crews. These items are stored in the shoring trailer and in each sewer department truck. Personnel are responsible for ensuring supplies are appropriate and in working order and are responsible for obtaining additional supplies as needed. A full description of departmental staffing and equipment (including emergency equipment) is available on request.

Job Site Safety Equipment:
Ladder (extra heavy duty industrial with IA duty rating), traffic wand, traffic control devices such as flags and cones, flashing barricades, caution tape, safety harness and lifeline, tripod, safety rope, gas detector, slit fencing, flag stands, barricades, and detour arrowboard.

Construction Materials:
Clean rags, tape, assorted hand tools (e.g., screwdrivers, wrenches, hammers, brooms, sledge hammers, pry bars), assorted ropes, picks and shovels, Spray Paint.

Personal Safety Equipment:
Hard hat, safety glasses, safety vests, gloves, rain suit, steel toed work and/or rubber boots, isopropyl alcohol, and ear protection,
First Aid Kit, flashlight, waterless soap and hand towels.

Other:
camera and video, portable blower and sufficient hose, high intensity flash light, gas meters, and dye.

Inspection:
As with any vehicle or major equipment, the operator should perform a pre-use inspection before beginning work activities.

Crews are instructed to have and use the job site and personal safety equipment that is appropriate for each emergency situation.

Confined Space Entry:
For permit required confined space entries, all personnel shall refer to the procedure in the Code of Federal Regulations, 29 CFR 1910.146.

The following specific response procedures are contained in the following pages:

PROBLEM: Sewer Blockage or Back up into Basement
PROBLEM: Overflowing Sewer Manhole Resulting from Surcharged Trunk Sewer (No backup into building)
PROBLEM: Cavities and Depressions in Streets and Lawns
PROBLEM: Sewage Force-Main Break
PROBLEM: Sewer Main Break/Collapse
PROBLEM: Air Release and Vacuum Relief Valve Failure
PROBLEM: Waste Water Pump Station Alarms General Response Actions
PROBLEM: Pumping Station Failure Inside Valve Pit, pump or valve failure (submersible type application)

PROBLEM: Sewer Blockage or Back up into Basement

EMERGENCY PROCEDURES:

- Dispatcher refers to sewer maps for location and to determine critical facilities and sewer sub-area to provide to dispatch crew. If the area of the complaint is served by a pump station, check to confirm whether any alarms from the pump station have been received.
- Dispatch the crew immediately to the complainant address with details. Crew notifies complainant/property owner(s) when they are on site.
- If the flow is questionable (not reasonable for the given service area) go to the upstream manhole to visually compare flows.
- If the flow from both manholes is reasonable for the area, notify the property owners that the problem is in their service lateral and to contact a plumber or sewer service contractor to relieve the blockage as described under **'Steps to be Taken By Property Owners When Sewage Back-Up Is Determined to be Due to Blockage In Private Lateral Connection'**.
- Use the necessary equipment to relieve the blockage, either by jet flushing or power rodding (if jet flushing is not sufficient to clear the blockage, request staff to bring power rodding equipment).
- If the downstream manhole is full and there is a potential for overflow, immediately begin the set up for pumping around the blockage (see "Overflowing Sewer Manhole" procedure)
    - Request additional manpower and equipment as needed (e.g. excavating crew, bypass pumping equipment, etc.)
    - Set up pump out equipment and hoses from the upstream manhole to the nearest flowing manhole below the blockage.
- Continue checking manholes downstream until a dry manhole is found indicating a blockage upstream.
    - See "Overflowing Sewer Manhole" procedure for pumping around the blockage while the line is repaired
    - Note: if no blockage is found and the problem is attributable to a pump station problem refer to Pump Station responses.
- Notify supervisor and describe the blockage. The supervisor will notify the proper authorities and agencies (See responsibility chart).
- Cordon off the area if ponding occurs on the street or easement (public or private).
- Collect as much of the sewage as possible, disinfect, notify surrounding homes (superintendent notifies appropriate officials, as needed).
- Schedule a television inspection if necessary.
- If the blockage is in a public line, relieve the blockage, clean up the property owner's basement as per policy on disinfecting. If blockage is determined to be in property owner's lateral connection, direct property owner to to clear the line.
- Make out a report indicating the time of the call, a description of the problem, repair work done, personnel present and equipment used.

NOTES:

1. When available, use collected debris to try to determine the cause of the blockage. Confirm removal of all debris from the manhole.
2. Record the water damage to all items in the basement. Record all actions taken (from start to finish) in log/record book, including equipment and personnel that were utilized.

Sewer Blockage or Back up into Basement, Minimum Levels of Staffing (people): 2	
Minimum Emergency Equipment	**Specialized Equipment**
• Jet flushing unit if available • Rodding machine & associated cleaning/cutting attachments (sand trap) • Standard harness and lifeline if applicable • Air blower with hose • Power vacuum • Portable pumps • Portable generators • Safety cones/barricades • Gas meter – for oxygen deficient, explosive or toxic gases • Confined space entry tripod and associated equipment	• Closed Circuit Television camera unit • Truck with hoist • Vactor unit • Power saw (circular) • Pipe cutter (hydraulic)

City of Marion Sewer Department
STEPS TO BE TAKEN BY PROPERTY OWNERS WHEN SEWAGE BACK-UP IS DETERMINED TO BE DUE TO BLOCKAGE IN PRIVATE LATERAL CONNECTION

After the Collection System crew has checked the Marion sewer for blockage and has found that the public sewer is not blocked, they will notify the property owner. It is the City of Marion Sewer Department's policy that if the main sewer is clear then the property owner is responsible for freeing any blockage which might exist in the private lateral. The property owner is responsible to pay for this activity.

All repair work on the sewer connection to the city main sewer must be performed under permit issued by the City of Marion to a licensed plumber, and will be inspected by the sewer department personnel.

WARNINGS:
If the property owner, licensed plumber, drain layer or sewer cleaner does not call the sewer department and request the public sewer line to be checked prior to rodding, the City of Marion will not assume liability if the problem is located in the public sewer line.

PROBLEM: Overflowing Sewer Manhole Resulting from Surcharged Trunk Sewer (No backup into building)

EMERGENCY PROCEDURES:

- Dispatch the crew immediately to the problem location.
  - Refer to sewer maps for location of sewers (private lands, flow patterns, manholes, etc.) and determine if the area is served by a pump station before responding to the call.
- Go to the location of the overflowing manhole to assess the immediate danger to public health or the environment.
- Determine the location of the blockage by inspecting the downstream manholes until a dry manhole is found. Immediately begin the set up for pumping around the blockage
  - Request additional manpower and equipment as needed (e.g. excavating crew, bypass pumping equipment, etc.) or to help with evaluating options for pumping around the blockage.
  - Set up pump out equipment and hoses from the upstream manhole to the nearest flowing manhole below the blockage.
- Remove the debris from the manhole and assess it to try to determine the cause of the blockage.
- Use the necessary equipment to relieve the blockage, either by jet flushing or rodding. If jet flushing is insufficient to clear the blockage, send personnel to bring rodding equipment.
- If it is imminent that the waste water will be released into wetlands, receiving waters or a drinking water supply watershed, notify supervisor or lead man, who will call in extra crew and coordinate emergency equipment. The supervisor will also notify the proper authorities and agencies including the fire department to set up flotation booms across streams, brooks, etc. if necessary. (See responsibility chart)
- Gather and remove sewage related debris and organic matter from the affected area.
- If the wastewater is in the streets/roads (public or private), use sand bags or similar items to contain the waste water to minimize any impact to public health or the environment.
- Sandbag nearby catch basin inlets or paved leak-offs to prevent the waste water from entering the drainage system and causing potential contamination to the receiving waters.
- Cordon off the area if ponding occurs.
- Collect as much of the sewage as possible, disinfect according to policy, notify surrounding homes (superintendent notifies appropriate officials, as needed).
- If the waste water jeopardizes a playground or park, cordon off the entire area. Close the park to the public until the issue has been remedied to the satisfaction of the local and state boards of health and the local park superintendent.
- Complete a report indicating the time of the call, description of the problem, repair work done, personnel present and equipment used.
- If sewage overflowed the collection system, file the Overflow Notification Log and Overflow Report Form.

Overflowing Sewer Manhole, Minimum Levels of Staffing (people): 2-3	
Minimum Emergency Equipment	**Specialized Equipment**
• Jet flushing unit if available • Rodding machine & associated cleaning/cutting attachments (sand trap) • Standard disinfectants • Safety harness and lifeline if applicable • Air blower with hose • Power vacuum • Portable pumps • Portable generators • Safety cones/barricades • Caution Tape • Gas meter-for oxygen deficient, explosive or toxic gases • Confined space entry tripod and associated equipment • Sand bags	• CCTV camera unit • Truck with hoist • Vactor unit • Power saw (circular) • Pipe cutter (hydraulic) • Caution tape • Floatation booms if necessary

PROBLEM: Cavities and Depressions in Streets and Lawns

EMERGENCY PROCEDURES:

- When a call is received from the public, confirm the following:

    1. That the problem area is in fact a cavity or depression and not a missing or low manhole cover, gate box cover or catch basin grates.
    2. The location of the reported cavity and the name and address of the party making the call.

- If the caller indicates the problem is severe, extensive or obviously associated with the sewer or water system, investigate and barricade the condition if it appears appropriate to do so. Lights and barricades should be used if the situation is dangerous. Notify the water department and street department immediately to aid in the cause investigation.
- When checking a depression over a main sewer, it is important to check the main sewer at both the upstream and downstream manholes adjacent to the depression to determine if there is a restriction of flow. If there is a blockage, it may indicate a possible main sewer break.
- If the cavity is a result of a sewer failure, refer to procedures for sewer main collapse and repair as appropriate.
- If it has been determined that it is a cavity or depression caused by other utilities (storm drain, water main, etc.), the crew should notify the responsible unit, and request that they take over the repair.
- The crew leader should thoroughly document the nature and extent of the impacts including the use of photographs and video footage where possible.
- Make out a report indicating the time of the call, a description of the problem, the repair work done, personnel present and equipment used.
- If sewage overflowed the collection system, file Overflow Notification Log and Overflow Report Form.

Cavities and Depressions in Streets and Lawns , Minimum Levels of Staffing (people): 1	
Minimum Emergency Equipment	**Specialized Equipment**
• Safety cones/barricades • Refer to emergency procedures for sewer break if confirmed	• Caution tape

PROBLEM: Sewage Force-Main Break

EMERGENCY PROCEDURES:

- Dispatch a crew to the site to assess the situation, including determination of whom and what might be affected and the immediate danger to the environment.
- Refer to sewer maps for location of sewers (private lands flow patterns, manholes, etc.) and determine the pump station associated and which critical facilities are in the area.
- Set up traffic cones and barricades as needed.
- Initiate measures to contain the sewer overflow, protect any streets, public areas, catch basin inlets, etc. that might be subject to flooding, and collect wastewater that has been discharged so as to minimize impact to public health and the environment.
- Determine if it will be possible to pump around the break, from the pump station wetwell to the force main discharge manhole or other accessible manhole, and if so, prepare to pump around the break as described below:
    - Request additional manpower and equipment as needed (e.g. excavating crew, bypass pumping equipment, etc.)
    - Set up pump out equipment and hoses from the wetwell to the nearest sewer discharge point.
    - Draw down the wet well as much as possible to maintain the low level.
    - Lock-out and tag-out (LOTO) the pumps in the pumping station.
- If pumping around the break is not possible, utilize the vactor truck or septage hauler to draw down the wet well as much as possible and maintain a low level.
- Call in additional crews as necessary to help contain the sewer overflow. Set up flotation booms across streams, sandbag storm drains, etc., as necessary.
    - Check the tributary area to determine if the discharge will affect any receiving waters.
    - If it is determined that the receiving water may be affected, the supervisor should notify the proper authorities or agency.
    - If the wastewater is in streets/roads (public or private), contain the waste water to the extent possible with sandbags or other containment devices.
    - Sandbag nearby catch basin inlets or paved leak-offs to prevent the wastewater from entering the drainage system and causing potential contamination to the receiving waters.
    - Cordon off the area if ponding occurs.
    - Collect as much of the sewage as possible, disinfect according to policy, notify surrounding homes (superintendent notifies appropriate officials, as needed).
    - If the wastewater jeopardizes a playground or park, cordon off the entire area. Close the park to the public until the issue has been remedied to the satisfaction of the local and state boards of health and the local park superintendent.
    - Gather and remove sewage related debris and organic matter from the affected area.
- Drain the force-main:
    - Close down the gate valve on the upstream side of the discharge check valve in the pumping station.
    - Open the check valve by hand and secure it in place.
    - Slowly bleed the force-main back into the wetwell by slowly opening the gate valve on the discharge side of the pump, but only to the point where the force-main stops leaking and there is enough room to make the repair. Constant communication must

take place between the crew located at the break and the crew located at the pump station.
    - Close the gate valve and return the check valve to its normal operating position and then fully open the gate valve.
- Repair force main break as per policy.
- After the repair is complete, remove LOTO and return the pumps to normal operating position.
- Run the pump in the hand manual position to fill the force-main (Care must be taken during filling of force main – use only one pump during filling). Once completed, observe several pumping cycles before completely back-filling the excavation.
- Upon confirmation of adequacy of the repair, backfill the excavation (if necessary) and restore surface conditions to match existing conditions.
- While the crew is restoring the excavation, the crew leader should conduct a preliminary assessment of damage to private and public property. The crew leader should thoroughly document the nature and extent of the impacts including the use of photographs and video footage where possible.
- Make out a report indicating the time of the call, a description of the problem, the repair work done, personnel present and equipment used.
- If sewage overflowed the collection system, file Overflow Notification Log and Overflow Report Form.

Sewage Force-Main Break, Minimum Levels of Staffing (people): 4-5	
Minimum Emergency Equipment	**Specialized Equipment**
• Portable bypass pumping units • Hoses • Standard disinfectants • Safety harness and lifeline if applicable • Air blower with hose • Power vacuum • Portable generators • Safety cones/barricades • Gas meter-for oxygen deficient, explosive or toxic gases • Confined space entry tripod and associated equipment	• CCTV camera unit • Truck with hoist • Vactor unit or septage hauler • Power saw (circular) • Pipe cutter (hydraulic) • Caution tape • Floatation booms if necessary • Self Contained Breathing Apparatus (SCBA)

PROBLEM: Sewer Main Break/Collapse

EMERGENCY PROCEDURES:

- Dispatch a crew to location of break/collapse immediately while referring to the sewer maps for location of sewers (private lands flow patterns, manholes, etc.) to determine which critical facilities are in the area.
- Crew sets up signs, barricades, and/or barrels for traffic control and public safety, rerouting traffic as necessary and deploying traffic control measures such as police or flag person as needed.
- If it is a main line break, the Superintendent shall notify the appropriate authorities and town officials immediately.
- Request additional manpower and equipment as needed based on initial damage assessment (e.g. excavating crew, equipment to pump around the break, etc.)
- Pumping around the break from the upstream manhole to the downstream manhole may be required. If necessary, set up bypass pumping equipment. If not necessary, prepare for repairs while the pipe is flowing.
- Call in additional crews to set up flotation booms across streams, install sandbags, etc., as necessary. Unless special conditions exist, **pumping around the failed sewer main is a priority** before containing the overflow.
- Gather and remove sewage related debris and organic matter from the affected area.
- If the wastewater is in the streets/roads (public or private), use sand bags or similar devices to contain the wastewater to minimize any impact to public health or the environment.
- Sandbag nearby catch basin inlets or paved leak-offs to prevent the waste water from entering the drainage system and causing potential contamination to the receiving waters.
- Cordon off the area if ponding occurs.
- Collect as much of the sewage as possible, disinfect according to policy, notify surrounding homes (superintendent notifies appropriate officials, as needed).
- If the waste water jeopardizes a playground or park, cordon off the entire area. Close the park to the public until the issue has been remedied to the satisfaction of the local and state boards of health and the local park superintendent.
- Determine the location of the break/collapse and make any necessary repairs. Use repair procedures consistent with policy. If the break is on the pipe length, then a repair can be made with a wrap-around sleeve. If the break is at the bell, then a bell-joint clamp may be used.
- Upon confirmation of adequacy of the repair by the superintendent or lead man, backfill the excavation (if necessary) and restore surface conditions to match existing conditions.
- To restore the sewer line to full capacity, the crew should remove any debris that may have entered and accumulated in the sewer line downstream and upstream from the break/collapse. The crew should clean the sewer line as described below.
- Using the high velocity jet-flushing Vactor, begin flushing from the downstream manhole against the flow to the upstream manhole.
- Repeat this procedure for several upstream and downstream pipe reaches.
- The crew leader should thoroughly document the nature and extent of the impacts including the use of photographs and video footage where possible.
- Make out a report indicating the time of the call, a description of the problem, the repair work done, personnel present and equipment used.

- If sewage overflowed the collection system, file Overflow Notification Log and Overflow Report Form.

Sewer Main Break/Collapse, Minimum Levels of Staffing (people): 4	
Minimum Emergency Equipment	**Specialized Equipment**
• Portable bypass pumping units • Hoses • Jet flushing unit if available (sand trap) • Standard disinfectants • Safety harness and lifeline if applicable • Air blower with hose • Power vacuum • Portable pumps • Portable generators • Safety cones/barricades • Gas meter-for oxygen deficient, explosive or toxic gases • Confined space entry tripod and associated equipment	• CCTV camera unit • Truck with hoist • Vactor unit • Power saw (circular) • Pipe cutter (hydraulic) • Caution tape • Floatation booms and sand bags as necessary • Self Contained Breathing Apparatus (SCBA)

PROBLEM: Air Release and Vacuum Relief Valve Failure

EMERGENCY PROCEDURES:

- These valves require frequent inspection and maintenance. Their failure is often found during routine inspections. Both these types of valves may fail to operate reliably if grease is allowed to accumulate in the valve or on the operating mechanism.
- Inspection crew should inspect valves in accordance with the specific manufacturer's recommendations.
- Attach fittings at the top and the bottom to permit back flushing of all valves upon initial installation or retrofit upon failure.
- Isolate the valve from the force-main by closing the shutoff valve attached to the force-main.
- To clean the internal components of the valve(s), attach a back-flushing hose to a pressurized water source using a quick disconnect coupling.
- Place a blow off discharge hose in a container to collect the back-flush water from the blow off valve. This is wastewater that should not be discharged onto the street or into the valve pit.
- Open the shutoff valve and back-flush the valve through the blow off valve at the bottom.
- If you are using a potable (drinking) water source, provide the system with an anti-siphon device or back flow to prevent contamination of the potable water.
- Make out a report indicating the time of the call, description of the problem, repair work done, personnel present and equipment used.
- If sewage overflowed the collection system, file Overflow Notification Log and Overflow Report Form.

Air Release and Vacuum Relief Valve Failure, Minimum Levels of Staffing (people): 3	
Minimum Emergency Equipment	**Specialized Equipment**
• Hose with quick disconnect fitting and anti siphon device • Blow off discharge hose and waste container • Standard disinfectants • Safety harness and lifeline if applicable • Air blower with hose • Power vacuum • Portable pumps • Portable generators • Safety cones/barricades • Gas meter-for oxygen deficient, explosive or toxic gases • Confined space entry tripod and associated equipment	• CCTV camera unit • Truck with hoist • Vactor unit • Power saw (circular) • Pipe cutter (hydraulic) • Caution tape • Self Contained Breathing Apparatus (SCBA)

PROBLEM: Wastewater Pump Station Alarms General Response Actions

EMERGENCY PROCEDURES:

- Send an individual to the station indicating an alarm as soon as possible for a Priority Alarm. **Responders should bring a detailed station-specific trouble-shooting guide with them for that particular station.** If serious trouble is found, call for additional assistance and keep an individual at the station until further instructions are received.
- Always check with the power company when an alarm goes on to see if there is a power outage in the area, although a power failure that has not been reported to the power company can occur at a pump station. The pole number nearest the station should be reported.
- Personnel called in to investigate pump station alarms shall respond to the station even if the alarm has cleared prior to their arrival. All alarm conditions are to be checked and logged. Use the following guidelines and follow confined space entry procedures if applicable:

Wetwell/Drywell Type Stations

1. Observe all safety precautions per training.
2. Check the atmosphere within drywell with gas meter prior to entering.
3. Upon entry, identity the storage capacity in the well. This will give some indication of the time available for response. If flooded, skip to pump-out steps under "Pumping Station Failure inside valve pit, pump or valve failure" procedure.
4. Take your time entering the drywell. Never enter a flooded drywell.
5. Note any unusual odors - i.e. burning electrical equipment or paint.
6. Listen and note any unusual noises.
7. Check for heat around pump motors and pump bearing housings. Note any which seem unusually hot.
8. Observe every piece of equipment in the station. Note anything that looks out of place.
9. Record all gauge readings including wet well level, hour meters, flow charts, on-off levels, psi gauges on pump, rpm (on VFD's) and anything else that you feel is significant.
10. Using available information and the trouble shooting guide, systematically run through the system. Use a process of elimination to identify the cause of the failure. Check the level controls, check pump operation using manual position, check pump output by pressing on check valve counterweight as defined in the trouble-shooting guide. Once the cause of the problem is isolated, engage mechanical or electrical disciplines for repairs.
11. Emergency personnel should be absolutely certain that the cause of the pump station alarm or failure has been properly identified and corrected prior to leaving the station.
12. Reset any/all alarm feature indicator lights.

Submersible Type Stations

1. Take all safety precautions per training.
2. Check the atmosphere within the wetwell with a gas meter prior to working over the top.
3. Note any unusual odors - i.e. burning electrical equipment, hot or smoking oil, or paint.

4. Listen for any unusual noises and note if pump(s) are running.
5. Observe every piece of equipment in the station (pay specific attention to the level control system). Note anything that looks out of place.
6. Record all gauge readings from the control panel including: wet well level, hour meters, flow charts, on-off levels, psi gauges on pump, rpm (on VHD's) and anything else that you feel is significant.
7. Using available information and the trouble-shooting guide, systematically run through the system. Use a process of elimination to isolate the cause of the failure. Check level controls, check pump operation using manual position, check pump output by observing the check valve counterweight as defined in the trouble shooting guide. Once the cause of the problem is isolated, engage mechanical or electrical disciplines for repairs
8. Emergency personnel should be absolutely certain that the cause of the pump station alarm or failure has been properly identified and corrected prior to leaving the station.
9. Reset any/all alarm feature indicator lights.

- Check the O&M manual to trouble shoot the level sensor system and pump controls
- Pumps may be checked easily for operation by checking the arm of the check-valve in the discharge line of an operating pump. If it feels "spongy" (or soft) when downward pressure is applied with the palm of the hand, the pump is pumping. If a breaker is off and the pump motor is hot to the touch, DO NOT attempt to reset and start. If a pump motor is simply warm, one attempt to restart can be made. Turning the selector switch to manual will normally start a pump, and the check valve arm should move upwards. If the pump has lost prime or is lugged, the check valve will not open.

Wastewater Pump Station Alarms General Response Actions, Minimum Levels of Staffing (people): 2	
Minimum Emergency Equipment	**Specialized Equipment**
• Gas meter-for oxygen deficient, explosive or toxic gases • Self Contained Breathing Apparatus (SCBA) • Harness and lifeline	• As applicable for trouble-shooting

PROBLEM: Pumping Station Failure Inside Valve Pit, pump or valve failure (submersible type application)

EMERGENCY PROCEDURES:

- Dispatch pumping station crew to the pumping station immediately.
- Prior to viewing the wetwell, measure the atmospheric conditions for sufficient oxygen and the presence of explosive or toxic gases.
- Upon arrival the crew should identity the storage capacity in the wetwell. This will give some indication of the time available for response. If flooded, skip to pump-out steps.
- Inspect the main controls looking for failure indications. Check processor to determine failure if applicable. If pump failure is determined, skip to wetwell inspection steps.
- Inspect the valve pit. Observe all valves and force mains. If flooded, arrange to pump out the valve pit. If failure within the valve pit is detected, skip to pump-out steps.
- Constantly monitor the atmospheric conditions while working in or above the wetwell. Inspect the wetwell. Check the wetwell floats or level control system, bar rack and pump volute area for clogging or other problems.

Pump-Out Steps

- If pump failure, determine if pump out is necessary. If unnecessary, skip to repair procedures.
- Pump the flow with portable pumps. Call additional crew to bring appropriate portable pump(s) including all required lengths of suction and discharge hose, to the pumping station if necessary. Upon arrival of the portable pump, connect the appropriate lengths of suction hose that will suspend all the way into the wetwell, and then connect enough discharge hose to pump into appropriate manhole or connection (if so equipped). Go through the procedures for starting the portable pump, and begin pumping.

Repair Steps

- Lock out and tag out (LOTO) the main line, disconnect (if applicable).
- Monitor the atmospheric conditions for sufficient oxygen and the presence of explosive or toxic gases. If safe, enter valve pit or wet well and inspect the piping and valves for cause of failure.
- Complete repairs to pipe, pump or valve as per policy. If permanent materials are not readily available, install temporary repairs until the permanent repairs can be completed.
- Restore facilities to normal and inspect other components of the force main and pumping system for signs of similar failure.
- Shut down portable pumping operation. Do not disconnect hoses until repair is checked for leaks. Operate pumps to check repair under pressure and normal operating conditions.
- If no leaks are observed, return pumps to normal conditions by removing LOTO. Monitor pumps to check lead/lag operations.
- Make out a report indicating the time of the call, description of the problem, the repair work done, personnel present and equipment used.
- File Overflow Notification Log and Overflow Report Form.

Pumping Station Failure Caused by Force-Main Break inside valve pit, pump or valve failure, Minimum Levels of Staffing (people): 2-4	
Minimum Emergency Equipment	**Specialized Equipment**
• Harness and lifeline • Flash light • Emergency lighting • Portable pumps and hoses • Gas meter-for oxygen deficient, explosive or toxic gases	• Self Contained Breathing Apparatus (SCBA)

5.3 Emergency Support

Addressing some problems may require resources beyond the Marion Sewer Department forces. This is particularly true of main line breaks where there is a risk of a significant sewer overflow. In these situations, the City of Marion may enlist the aid of an emergency contractor. The City of Marion Sewer Department works closely with several companies for situations that require the prompt reconstruction of sewer lines. These companies are capable of mobilizing construction equipment and personnel quickly to handle emergency assignments.
These companies are capable of mobilizing construction equipment and personnel quickly to handle emergency assignments. The response time and the level of response will vary due to several factors, some are identified below:

- Location of the sewer repair in relation to the contractor's equipment yard
- Scope of the repair, size of sewer, depth of sewer and volume of flow
- The size, type and availability of equipment and number of workers
- The time of day, day of the week and the proximity to a holiday
- Weather conditions, clear, rain, snow, extreme cold or heat

Mutual Aid

Mutual Aid is provided by the following city departments to supply equipment, materials, and personnel in an emergency situation;

City of Marion Public Works Department
Equipment, Materials, and Personnel
Dump trucks, flatbed trucks, backhoe
Portable pumps, auxiliary personnel

Contact: Doug Phillips, Street Superintendent
Telephone: 618-964-0263

City of Marion Fire Department
Equipment, Materials, and Personnel , ventilating fans

Contact: Jerry Odum, Fire Chief
Telephone: 911

6. OVERFLOW REPORTING

6.1 Overview

The Sewer Department superintendent completes an Overflow Report. The Responsibilities Chart in Section 1 and the Notification Matrix in Section 4 provide guidance on proper reporting. The superintendent or designee promptly notifies appropriate department and agencies when the overflow is eliminated. The information collected will also provide the City of Marion Sewer Department with valuable information to inform decisions regarding collection system rehabilitation and replacement, scheduling, staffing, equipment needs, budgeting and updating this and other emergency response plans.

Note: Illinois EPA Regional Office must be contacted within 24 hours of when the community becomes aware of an SSO. Between the hours of 8:30 AM and 4:00 PM, the O&M Section can be reached at 618-993-7200. When calling to report a wastewater emergency or bypass during regular hours, it is important to actually speak with a staff member, DO NOT leave a recorded message. If someone from the O&M section is not available, speak with the receptionist and give them the general information; they will then contact an appropriate staff member. If you call outside of business hours, follow the prompt on the recorded message.

6.2 Reporting Details

- The dispatcher provides details on the time, location, description, and map locations of overflows
- The start time of the sewer overflow is determined by one of the following methods:
    a. Date and time information received and/or reported to have begun and later substantiated by a sewer investigator or response crew;
    b. Visual observation
    c. Pump station and lift station flow charts and other recorded data. At major pump stations this information is available from the Treatment Plant SCADA System.
- The stop time of the sewer overflow is determined by one of the following methods:
    a. When the blockage is cleared or flow is controlled or contained; or
    b. The arrival time of the sewer investigator or response crew, if the overflow stopped between the time it was reported and the time of arrival.
- An estimation of the rate of sewer overflow is made by one of the following criteria:
    a. Direct observations of the overflow; or measurement of actual overflow from the sewer main.
    b. When the rate of overflow is known gallons per minute (GPM), the duration of the overflow is multiplied by the overflow rate; or when the rate of overflow is not known, the surrounding area is investigated for evidence of ponding or other indications of overflow volume.
- Visual observations should be recorded for any unusual observations
- Photographs and videotapes are taken at the event and response when possible.
- The nature and extent of any damage or impacts to public/private property are assessed.
- Repair crews provide a report indicating the time of the call, a description of the problem, the repair work done, personnel present and equipment used

Reports are kept in a file and evaluated annually to determine patterns and trends and to provide

input to our asset management program.

6.3 Customer Satisfaction

The superintendent or lead man confirming the overflow follows up in person or by telephone with the citizen(s) reporting the overflow. The cause of the overflow and its resolution will be disclosed.

In the event of a longer term emergency response, the following table indicates who will be responsible for communicating with the public and the media:

Designated spokesperson and alternates

Spokesperson	Alternate 1	Alternate 2
Brent Cain, Superintendent	Rick Herring, Outside Lead Man	David Williams, Plant Lead Man

City of Marion Sewer Department
Lift STATION/COLLECTION SYSTEM OVERFLOW QUESTIONNAIRE

Wastewater Treatment Facility/municipality reporting_____

1. Location of overflow:_____
2. Who notified WWTF/municipality?_____
3. Time and date of above notification_____
4. Date overflow started:_____ Time overflow started:_____

5. Date overflow ended:_____ Time overflow ended:_____

6. Cause of failure: _____
_____

7. Amount of overflow:_____

8. Was overflow treated with emergency chlorination?_____ Time chlorination started:_____ Amount of chlorine used:_____

9. What waterbody did the overflow discharge to?_____

10. Detail chronology of events leading to failure/overflow: _____
_____
_____

11. Detail chronology of response indicating all steps taken to minimize the amount of overflow:
_____
_____
_____

12. If applicable, were septage haulers and/or emergency generators used to minimize the amount bypassed? (If use was possible but not implemented, why not?)
_____
_____
_____

13. What actions are being taken to mitigate and/or prevent further occurrences?
_____
_____
_____

14. Notification of Illinois EPA(during business hours #: 618-993-7200)
Person Notified_____ Date/Time:_____
By_____

Appendix 1

Guidance on estimating sewer overflow volumes[1]

A variety of approaches exist for the estimation of the volume of a sanitary sewer overflow. This appendix documents methods that are often employed. Other methods are also possible. The person preparing the estimate should use the method most appropriate to the SSO using their judgment.

Method 1 "Visual Estimate"

The volume of very small spills can be estimated by imagining the amount of water that would spill from a 5-gallon bucket or 50 gallon barrel. If the spill is larger than the amount of liquid from a 50 gallon barrel, try to visualize how many barrels the standing water would fill and them multiply by the number of barrel volumes by 50. This method can be useful for contained spills that are not more than a couple of hundred gallons.

Method 2 "Measured Volume"

The volume of some small spills can be estimated using this method if it is not raining. The shape dimensions and depth of the spilled wastewater are needed to use this method. The shape dimensions are used to calculate the area of the spill and the depth calculates the volume.

1. Sketch the shape of the contained area of sewage
2. Measure or pace off the dimensions and add the dimensions to your sketch
3. Measure the depth in several locations and then average the depth for the spill. (If the shape and depth vary, break your sketch into sections and calculate the volume of each by repeating the steps below)
4. Convert the dimensions to feet (if they are not in feet to begin with)
5. Calculate the area using the following formulas (depending on the shape of the spill):

Rectangle	Area = length X width
Circle	Area = diameter X diameter X 0.785
Triangle	Area = base X height X 0.5

6. To get the volume in cubic feet, multiply the area times the average of the depths you measured
7. Multiply the volume by 7.5 to convert to gallons

Method 3 "Duration and Flow Rate"

Calculating the volume of spills where it is difficult or impossible to measure the area and depth requires a different approach. In this method separate estimates are made of the duration (the elapsed time from the start of the overflow to the time the spill is stopped) of the spill and the flow rate.

Start time can be difficult to establish. Here are two approaches to estimating start time:

For very large overflows, changes in flow on a downstream flow meter can be used to establish the start time. Typically, the daily flow peaks are "cut off" of flattened by the loss of flow. This can be identified by comparing hourly flow data on the downstream flow meter.

Conditions at a spill site may change with time. Initially, there will be limited deposits of grease and toilet paper. After a few days to a week, the grease forms a light colored residue. After a few weeks to a month the grease turns dark. In the latter two cases the quantity of toilet paper and other materials of sewage origin increase in amount. These changes with time can be

[1] Adapted from information in the following guidance and reporting document: http://www.swrcb.ca.gov/rwqcb2/news_items/sso%20reporting%20requirements%20nov%2011%202004.pdf

used to estimate the start time in the absence of other information.

Sometimes it is simply not possible to estimate the start time and the date that the overflow was first observed should be used on the form.

End time is usually much easier to establish. Field crews on site observe the "blow down" that occurs when the blockage has been removed. The end can also be observed in downstream flow meter readings.

Flow Rate:

One way to estimate flow rate is to look at changes in flow rates in the downstream flow meters to estimate how much of the flow rate was lost during the spill (this generally only works for large SSOs)

A second way to estimate flow rate is to base it on up-stream connections: Once the location of the spill is known, the number of upstream connections can be determined from records or your computerized system. Multiply the number of connections by 200 to 250 gallons per day per connection or 8-10 gallons per hour for each connection (or other flow rates that are consistent with your data for your connections).

Once duration and flow rate have been estimated, the volume of the spill is the product of the duration in hours (or days) times the flow rate in gallons per hour (or gallons per day).

Service/repair notification list

Electrician day – Jerry Hickey 618-751-3242 On staff electrician	Electrician night – Jerry Hickey 618-751-3242 On staff electrician
Electric Utility day – Ameren 800-755-5000	Electric Utility night – Ameren 800-755-5000
Plumber day – Baker Plumbing 618-993-6986	Plumber night – Baker Plumbing 618-993-6986
Pump Specialist day- Heartland Pump 618-985-5110	Pump Specialist night – Heartland Pump 618-985-5110
Soil Excavator day - KPS 618-218-2592	Soil Excavator night – KPS 618-218-2592
Equipment Rental day – Rent-All Sales 618-993-5044	Equipment Rental night – Rent-All Sales 618-993-5044

Notification procedures

Notifying collection system customers

Who is Responsible:	**Brent Cain**
Procedures:	Contact Water Office at City Hall, place notifications on City website

Alerting local law enforcement, state drinking water officials, and local health officials

Who is Responsible:	**Brent Cain**
Procedures:	Contact Illinois EPA Regional Office

Contacting service and repair contractors

Who is Responsible:	**Brent Cain**
Procedures:	Contact applicable contractors

Procedures for issuing a health advisory

Who is Responsible:	**Brent Cain**
Procedures:	Notify Dept. of Public Health, Bi-County Health Department, Illinois EPA

Power outage

Assessment	The Marion Sewer system is vulnerable to power outages, experiencing a few power outages per year that can last several hours. Other than the Halfway Road station which services the west side of Marion the system does not have a back-up generator; but has a connection so that a generator can be rented and plugged into the system. Storage is able to hold the pump station flow for several hours until power is restored.
Immediate actions	1. Assess whether the outage is likely to last more than 6 hours. If not, be on alert for changing conditions and monitor holding capacity. If yes, complete the following steps: 2. Call on availability of back-up generator at United Rentals, Mt. Vernon,Il at 618-244-5840. 3. Call on septage hauler at Baker Plumbing and arrange to collect overflow while waiting for generator. 4. Obtain generator if available. 5. Connect generator to system and resume operations. 6. Implement overflow response actions to inform customers to cut back on water usage until power is restored.
Notifications	1. Power Company – Let them know that a sewer collection system is experiencing an outage and the generator will be turned on until power is restored. 2. United Rentals – Obtain generator. 3. Customers – cut back on water usage until power is restored.
Follow-up actions	1. Turn off and disconnect back-up generator. 2. Return system to general power supply. 3. Inspect alarms and pumping facilities to ensure proper operation. 4. Return generator to United Rentals.

Training and Rehearsals

Training

Emergency response training is essential. The City of Marion's training educates system personnel about emergency situations and resulting effects on our wastewater system, public health and environmental impacts, and also provides an opportunity to practice responses.

Training

Staff position training needs and expectations.

Position	Training needs and expectations
System Manager	Response communications, emergency response planning, issuing health advisories
System Operators	Response communications, emergency response planning, suspicious activity training
Field support	Response communications, suspicious activity training
Administrative Support	Response communications, emergency response planning

Emergency rehearsals

Schedule for drills, tabletop exercises, and other ways to practice emergency response:

Event	Description	People and organizations involved	Date
Rehearsal	Conduct actual emergency drill	System staff	Unannounced
On-site training drills	Conduct specific drills, i.e, communications, pipe line breaks, sampling with a professional trainer	System staff and professional trainer	Unannounced 2016